

Bulletin of the Museum of Comparative Zoölogy

AT HARVARD COLLEGE.

VOL. LVIII. No. 11.

NEW MIOCENE COLEOPTERA FROM FLORISSANT.

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WITH SIXTEEN PLATES.

CAMBRIDGE, MASS., U. S. A.:
PRINTED FOR THE MUSEUM.

DECEMBER, 1914.

By H. F. WICKHAM.

THE very rich Coleopterous fauna of the Florissant shales was first studied by Dr. S. H. Scudder. He monographed the Rhynchophora as long ago as 1893 and seven years later published descriptions of the Adephaga and Clavicornia, with a few scattering members of other groups, expressing at the time his hope of completing the history at some later date. Illness and death intervened to prevent the fulfilment of this hope and general interest in the subject was so small that, with the exception of the description of half a dozen species by Cockerell and Beutenmueller, no more of the beetles were characterized for nearly a decade. Meanwhile several expeditions to the field had been made by various parties under Professor Cockerell which proved so productive that, upon the Coleoptera being submitted to me for examination, I was led to undertake a study not only of this material but also of that in the United States National Museum and the Princeton Geological Museum in the attempt to make the mass of specimens available for comparative statistical research in palaeontology. Later, I was able to make two trips to Florissant and to secure many additional species, especially those of small size. The combined results, so far as published, allowed my description of 172 new forms, which, with the 210 already made known by Scudder and the 6 described by Cockerell and Beutenmueller, raised the total number of species from these shales to 388. The present paper includes 86 novelties, while another, now in press, adds 20 more, thus giving a known fauna of 494 Coleoptera from this one locality. Perhaps sixty or eighty more remain in my hands for study and it is hoped that the investigation may be completed within a reasonable time. When the descriptive work is finished and the check list compiled, we shall have a basis for detailed comparisons with ancient and modern faunae sufficiently extensive to promise a fair degree of accuracy in our conclusions.

In this paper, I have confined myself, as far as descriptive work is concerned, to material from the S. H. Scudder collections, now the property of the Museum of Comparative Zoology. This is very rich

in beautiful specimens representing over a hundred undescribed species and was very kindly thrown open to me by the Museum authorities. At the time of my visit, it was tentatively arranged in drawers according to families. In some cases, a study of the specimens showed the need of another assignment and in consequence the finished result of the examination does not exactly agree with the provisional numerical list of species by families of Dr. Scudder. For instance, there are no Histeridae in the lot, though he speaks of having two. Some other groups run considerably below his estimate while certain families that he had not recognized at all are represented. I do not care to give out complete figures in advance of working over the still unstudied material that I have from other sources, but it will be worth while to make some remarks based upon what has been done.

A examination of the Florissant species included in the three Phytophagous families, Cerambycidae, Chrysomelidae, and Bruchidae, shows a curious state of affairs when compared with coincident assemblages in North America of today. For the sake of showing this readily, I have compiled a table from published lists which will indicate, roughly at least, the relative specific differentiation in these families in several widely separated areas. I have given also the corresponding figures of the Florissant fossil fauna.

	Actual numbers			Relative frequency		
	Chrys.	Ceramby.	Bruch.	Chrys.	Ceramby.	Bruch.
Iowa.	193	122	10	100	63+	5+
Cincinnati.	161	142	8	100	88+	5-
Dist. Columbia.	233	174	23	100	75-	10-
Indiana.	265	147	15	100	55+	6-
Colorado.	205	113	10	100	55+	5-
Bayfield, Wis.	50	59	0	100	118	0
Alaska.	12	17	0	100	142-	0
Florissant.	26	25	16	100	96+	62-

This table has to do with species, not with specimens. In the section devoted to relative frequencies, I have taken that of the Chrysomelidae to be 100 in order to get a uniform standard of comparison. It will be noted at once that the Florissant ratio between the Chrysomelidae and Cerambycidae is, relatively speaking, not strikingly out of proportion with that shown between these families in Ohio and the

District of Columbia. It diverges more widely from the percentages shown in Iowa, Indiana, and Colorado, while compared with Alaska and the southern shore of Lake Superior the Chrysomelidae are better represented at Lake Florissant. The Bruchidae show such a marked disparity as to call for instant comment — for while in the modern lists cited they constitute at the most less than ten per cent as great a number of species as the Chrysomelidae, in the Florissant fauna they reach nearly sixty-two per cent. Unfortunately no good or relatively complete lists of all three families exist for localities in the southwestern states, but it is well known that the Bruchidae are more abundantly differentiated specifically in that district. The combined lists of Schaeffer and Snow comprise 24 Bruchidae from Brownsville, Texas, while Schaeffer records 15 species of this family from the Huachuca Mountains of Arizona. In neither locality is there any pronounced poverty of Chrysomelidae, however, so that the relative development of the two families is totally different from that seen at Florissant. It seems that the Bruchidae, like the Rhynchophora, were relatively more abundantly represented by specific forms than was the case with most of our modern families.

Another striking discrepancy in specific representation is found in the Byrrhidae. Eight species are recognized from Florissant, all of good size and none belonging to the Limnichini. If we exclude Limnichus from consideration, none of the recent lists cited contains so many, though we may assume that the faunae of their respective regions are much better known than that of the ancient lake.

From these considerations, we are justified in believing that the proportional development of the various coleopterous families during the Miocene times differed, sometimes very decidedly, from that obtaining today. Consequently we should be conservative in using data derived from comparison of these lists with recent ones as bases of conclusions as to probable climatic conditions.

Regarding the citation of catalogue numbers, I have followed Dr. Scudder's plan of joining by "and" those which belong to a single individual with its counterpart. The drawings of the new species are all made by myself with a camera lucida and are intended to show the form, the outlines of the principal sclerites and the courses of the chief lines of sculpture. Restoration has been avoided. In a few cases, where the members of different sides were unlike through distortion both have been drawn in enlarged detail without special comment.

CARABIDAE.

BEMBIDIUM OBDUCTUM Scudder.

One poor specimen, No. 2,426 M. C. Z. (No. 6,529 S. H. Scudder Coll.) seems to belong here.

AMARA REVOCATA Scudder.

Two examples, No. 2,427 M. C. Z. (No. 3,233 S. H. Scudder Coll.); No. 2,428 M. C. Z. (No. 5,580 S. H. Scudder Coll.) are referred to this species though neither is in good condition.

AMARA POWELLII Scudder.

One specimen, No. 2,429 M. C. Z. (No. 264 S. H. Scudder Coll.).

AMARA COCKERELLI Wickham.

A single specimen, No. 2,430 M. C. Z. (No. 7,008 S. H. Scudder Coll.) referred here without much doubt.

DYTISCIDAE.

BIDESSUS LAMINARUM, sp. nov.

Plate 1, fig. 1.

Form similar to that of the recent *B. affinis*. The specimen shows either a ventral view or the dorsal aspect of an insect from which the elytra have been lost and gives no sculptural characters of any value. The prosternum is like that of recent *Bidessus*, but the sutures between the proximal abdominal segments are more distinct than in the living form with which I have compared it. Length, 2.25 mm.

Described from a single specimen.

Type.— No. 2,431 M. C. Z. Florissant, Col. (No. 11,166 S. H. Scudder Coll.). The stone carries a small parasitic Hymenopteron on the same side as the *Bidessus*, while on the opposite face is Dr. Scudder's number, cited above, and the insect to which it originally referred.

The beetle is surely a small dytiscid and since it bears so close a resemblance to recent species of *Bidessus* it seems well to refer it here. Considering the small size, it is fairly well preserved. It is one of the smallest insects known from the Florissant shales.

COELAMBUS MIOCENUS Wickham.

One specimen, No. 2,432 M. C. Z. (No. 5,869 S. H. Scudder Coll.) in poorer preservation than the type.

HYDROPORUS SEDIMENTORUM, sp. nov.

Plate 1, fig. 2.

Form short and stout, something like that of the recent *H. rivalis* and allied species. Head large. Prothorax distorted, but evidently nearly three times as broad as long. Coxal plates strongly and coarsely punctured, the punctures more or less confluent. Sternum between the plates similarly but hardly as strongly or thickly punctate, abdominal sculpture much finer. Hind leg stout. Length, as preserved, 3.25 mm.

Described from one specimen.

Type.— No. 2,433 M. C. Z. Florissant, Col. (No. 2,905 S. H. Scudder Coll.).

Distinguishable at first sight from *Coelambus miocenus* by the different form of the coxal plates as well as by that of the body. The state of preservation is not very satisfactory but I think that the outlines of the structures of the underside are properly delineated. None of the characters of the upper surface can be made out. I use the term *Hydroporus* in a broad sense, not being able to determine which of the genera of *Hydroporini* this insect should enter.

HYDROPHILIDAE.

TROPISTERNUS LIMITATUS Scudder.

One specimen, No. 2,434 (No. 3,807 S. H. Scudder Coll.).

TROPISTERNUS VANUS Scudder.

The only specimen No. 2,435 M. C. Z. is without original number and is evidently the counterpart of the one figured by Scudder.

PHILHYDRUS SCUDDERI Wickham.

Represented by one specimen, No. 2,436 M. C. Z. (No. 9,712 S. H. Scudder Coll.), slightly smaller than my type but exhibiting almost exactly the same proportions in length and breadth. It measures 4.50 mm. in length and 2.25 mm. in width.

HYDROBIUS TITAN Wickham.

One specimen, No. 2,437 M. C. Z. (No. 10,411 S. H. Scudder Coll.).

SILPHIDAE.

SILPHA BEUTENMUELLERI, sp. nov.

Plate 1, fig. 3.

Described from an elytron only, which is apparently a little broken at apex and much more so at base, but judging from the costae is approximately of its full original length. Sutural margin with well-defined bead, disk sharply tricostate, the costae nearly straight, slightly convergent apically, subequidistant, the inner separated from the suture by a distance markedly greater than the intercostal width. The outer costa, at middle, is about three fourths as far from the outer margin as from the suture, while exterior to it and separated from it by a space about equal to that between the suture and the inner costa is a deep groove extending the entire elytral length. Apex probably bluntly rounded. Punctuation well defined over nearly the entire surface, the punctures sharp and rather distant, finer at apex and (possibly on account of the state of preservation) not distinguishable exteriorly to the lateral groove. Length a trifle over 10 mm.

The single specimen is without counterpart.

Type.—No. 2,438 M. C. Z. Florissant, Col. (No. 5,111 S. H. Scudder Coll.).

At first, I had intended to refer this elytron to *Necrodes primaevus* from these shales. In length, the elytra of the two differ only about 1 mm., but the description of *N. primaevus* states that "except for the much shorter elytra it is difficult to separate this species by any tangible characters from the living *N. surinamensis*." It seems unlikely

that the two authors, Beutenmueller and Cockerell, would have overlooked so striking a difference as the spacing of the costae, which, in *N. surinamensis*, are about equidistant from each other and from the suture as well, while the distance from the exterior costa to the margin is relatively much less than in *S. beutenmuelleri*. The last species seems to have almost exactly the same arrangement of costae and groove as the recent European *S. tyrolensis* but the punctuation is finer and much better separated in the fossil. In this character it closely approaches the recent North American *S. noveboracensis*.

The insect is named for Mr. William Beutenmueller of New York.

STAPHYLINIDAE.

PHILONTHUS MARCIDULUS Scudder.

One good specimen, No. 2,439 M. C. Z. (No. 10,294 S. H. Scudder Coll.).

LAASBIUM AGASSIZII Scudder.

One example, No. 2,440 M. C. Z. (No. 1,229 S. H. Scudder Coll.).

COCCINELLIDAE.

COCCINELLA FLORISSANTENSIS, sp. nov.

Plate 1, fig. 4.

Form a little more elongate than in most of the recent North American species. Head in poor preservation, the outline broken. Prothorax short, sides not very well preserved but evidently arcuate and convergent anteriorly, apex much narrower than the base. Scutellum minute. Elytra without distinguishable maculation, estriate, outer edge margined but imperfect in the specimen. Upper surface extremely minutely alutaceous as in many recent Coccinellidae. Legs wanting. Length, 5.95 mm.

Described from one specimen.

Type.—No. 2,441 M. C. Z. Florissant, Col. (No. 5,551 S. H. Scudder Coll.).

The strongest reasons for placing this insect in the Coccinellidae are

found in the form and particularly in the sculpture. My first impression was that it belonged in *Hippodamia* but the pronotum is much more like that of *Coccinella* and it seems better to place it in the latter genus for the present. The outline was probably similar to that of the recent *C. trifasciata* and less rotund than in the Florissant fossil *C. sodoma*. The generic reference must be understood in the broad sense, as it is not likely that the insect was a true *Coccinella*.

EROTYLIDAE.

TRITOMA DILUVIANA, sp. nov.

Plate 1, fig. 5-6.

Form elongate, much like the recent *T. festiva*. Under surface of head closely, and, relatively to the size of the insect, moderately coarsely punctured at the sides. Eyes elliptical as seen from below, of normal size. Antennae about equal in length to two thirds of the prothoracic basal width, club composed of three subequal joints. Prothoracic length at middle about four sevenths of the basal width, sides convergent anteriorly and nearly straight in the type, apex about one fifth narrower than the base, front angles prominent, punctuation finer than that of the head. Meso- and metasternal areas obscurely punctate. Abdominal punctuation moderately coarse but shallow and well separated. Legs not preserved. Length, 5.25 mm., in life a little less.

Described from one specimen showing the underside.

Type.—No. 2,442 M. C. Z. Florissant, Col. (No. 4,512 S. H. Scudder Coll.). No. 2,443 M. C. Z. (No. 9,097 S. H. Scudder Coll.) is evidently the same species though not the counterpart of the type.

In the second specimen, the sides of the prothorax are well preserved and are seen to be regularly but gently rounded from the base similarly to the recent *T. thoracica* or *T. flavicollis*. This species is easily distinguished from the Florissant fossils *T. materna* and *T. submersa* by its greater size and more elongate form.

COLYDIIDAE.

RHAGODERIDEA, gen. nov.

General outline of *Rhagodera*, but with the margins entire or nearly so. Elytral sculpture weaker than in *Rhagodera*, striatopunctate.

Antennae apparently 9-jointed, the basal (visible) joint stouter than the apparent second, the third, fourth, fifth, and sixth subequal but only about half the length of the second. Club 3-jointed, gradually formed. It is possible that the true basal joint is concealed in which case each of those noted above should be moved up one number in the series.

Type.—*R. striata*, sp. nov.

RHAGODERIDEA STRIATA, sp. nov.

Plate 1, fig. 7-9.

Form moderately elongate, subparallel. Head of good size, roughly punctate, not so wide as the prothorax. Eyes not defined. Antennae rather short, reaching only slightly beyond the middle of the prothorax. Pronotum with only one side well preserved, but the length is evidently much less than the width, base and apex apparently subequal, side margin not or scarcely crenulate, a little reflexed, sculpture a rough punctuation similar to that of the head. Elytra about three and one half times as long as the prothorax, each with something more than eight fine but moderately deep punctate striae, the striae punctures of the same row close together. Interspaces apparently transversely wrinkled, somewhat cancellate near the elytral margins. Legs wanting. Length, 5.60 mm.

Described from one specimen.

Type.—No. 2,444 M. C. Z. Florissant, Col. (No. 7,006 S. H. Scudder Coll.).

While this beetle seems to be a colydiid, it disagrees in important characters with all the genera known to me. It is not at all surprising that insects like the Colydiidae become extinct, since they are highly specialized forms and are frequently very closely adapted to some particular habitat. This one is of large size for the family. It has something the appearance of *Rhagodera* but is not closely allied in any of the visible characters, even the sculpture being different.

CUCUJIDAE.

PEDIACUS PERICLITANS Scudder.

One specimen, No. 2,445 M. C. Z. (No. 8,135 S. H. Scudder Coll.). It is like the type figure except that the antennal club is a trifle more pronounced.

CRYPTOPHAGIDAE.

CRYPTOPHAGUS SCUDDERI, sp. nov.

Plate 2, fig. 1-2.

Form stout. Head moderately large, closely and deeply sculptured with circular punctures. Eyes not definable. Antennae with the first joint much enlarged and thickened, intermediate ones submoniliform, club fairly strong and three jointed. Prothorax nearly twice as wide as long, base a little narrower than the apex, sides nearly straight posteriorly, broadly arcuate in front of the middle, surface punctate very similarly to the head. Elytra broader than the prothorax, apices rounded, surface rather finely scabropunctate. Legs not preserved. Length, 3 mm.

Described from one specimen with counterpart.

Type.—No. 2,446, 2,447 M. C. Z. Florissant, Col. (No. 3,334 and 5,880 S. H. Scudder Coll.).

Differs from *C. bassleri* in being larger and of more elongate form. There is also some difference in the proportions of the antennal joints but these are none too clear in the present specimen so I do not like to lay too much stress upon this character. The detail sketch is made from the reverse of the specimen which served for the outline of the entire insect.

CRYPTOPHAGUS BASSLERI Wickham.

One specimen, No. 2,448 M. C. Z. (No. — ? S. H. Scudder Coll.).

DERMESTIDAE.

DERMESTES TERTIARIUS Wickham.

Two specimens, No. 2,449, 2,450 M. C. Z. (No. 7,683, 12,054 S. H. Scudder Coll.). The latter is a little smaller but otherwise is similar.

LATHRIDIIDAE.

CORTICARIA OCCLUSA, sp. nov.

Plate 2, fig. 3.

Form moderately elongate. Head large, finely punctured, nearly as wide as the prothorax and not much shorter though the anterior margin is not well defined and is probably somewhat extended in apparent length by confusion with the crushed mouthparts. Eyes and antennae not definable. Prothorax about one half broader than long, sides moderately arcuate, disk punctured somewhat more coarsely than the head. Elytra rather coarsely, closely, but not deeply punctured, with no sign of stria arrangement. Legs wanting. Length, to abdominal apex, 3.10 mm.

Described from a single specimen.

Type.—No. 2,451 M. C. Z. Florissant, Col. (No. 7,109 S. H. Scudder Coll.).

This is smaller and rather more evidently punctured than *C. petrefacta*. In life, with the abdomen in normal position, it would be of about the same size as the recent *C. pubescens*.

CORTICARIA PETREFACTA Wickham.

Two specimens, one with counterpart, No. 2,452-2,454 M. C. Z. (No. 7,711, 520 and 1,020 S. H. Scudder Coll.).

CORTICARIA EGREGIA, sp. nov.

Plate 2, fig. 4.

Form moderately elongate. Head about equal in length to the prothorax, finely, evenly and very closely punctate. Prothorax about one and one half times as broad as long, the apparently unbroken side nearly straight, apex not much narrowed, surface extremely closely punctate, more strongly and coarsely than the head. Elytra, taken conjointly, about one and one half times the prothoracic width, punctation confused, much sparser and apparently a trifle coarser than that of the prothorax. Legs wanting. Length, to abdominal apex, 4.25 mm.

Described from one specimen.

Type.—No. 2,455 M. C. Z. Florissant, Col. (No. 7,305 S. H. Scudder Coll.).

Probably not a true *Corticaria*, but having the form of that genus it will be sought for in this place. There is no evidence of hairs, even under high power. The large size will separate it from similar Florissant species.

BYRRHIDAE.

NOSOTETOCUS VESPERTINUS Scudder.

One specimen, with counterpart, No. 2,456, 2,457 M. C. Z. (No. 8,196 and 9,054 S. H. Scudder Coll.).

NOSOTETOCUS DEBILIS Scudder.

Two specimens, No. 2,458, 2,459 M. C. Z. (No. 7,687, 11,246 S. H. Scudder Coll.).

BYRRHUS ROMINGERI Scudder.

One specimen, No. 2,460 M. C. Z. (No. 6,389 S. H. Scudder Coll.).

CHELONARIUM MONTANUM, sp. nov.

Plate 2, fig. 5.

Form roughly elliptical. Head projecting slightly beyond the anterior prothoracic margin but showing no characters of interest. Pronotum subtriangular, very broad at the base which is lobed at middle and sinuate laterally, apex rounded, sides strongly convergent anteriorly. Along the basal margin is a series of strong punctures giving a crimped effect. Elytra broader behind the humeri, rapidly narrowing posteriorly, rounded at apex. Legs wanting. Length, from front margin of prothorax to elytral tip, 5.55 mm.

Described from one specimen.

Type.—No. 2,461 M. C. Z. Florissant, Col. (No. 2,975 S. H. Scudder Coll.).

This beetle has something the aspect of a *Brachys*, but the thoracic

front margin seems to have nearly or quite concealed the head during life. The sculpture is very fine throughout but in places the elytra show traces of punctulate striae. The pronotum is margined at the sides. While I have no specimens of recent *Chelonarium* for comparison, I think that the reference to this genus is fairly safe, since, in all visible characters, the agreement is close to the description of LeConte and the figure of Lacordaire (*Genera des Coléoptères*, Atlas, Plate 24, fig. 4.). This correspondence extends even to the crimping of the pronotal base as will be seen by examining the cited figure with a magnifying glass. *Chelonarium* is found in Florida and Central America and the occurrence of this fossil adds another distinctively southern form to the Florissant fauna.

PARNIDAE.

PSEPHENUS LUTULENTUS Scudder.

One specimen, No. 2,462 M. C. Z. (No. 11,659 S. H. Scudder Coll.), evidently the counterpart of the one figured by Scudder.

DRYOPS ERUPTUS Wickham.

Two specimens, No. 2,463, 2,464 (No. 6, 8,329 S. H. Scudder Coll.), appear to belong here.

DRYOPS TENUIOR Wickham.

A single specimen, No. 2,465 M. C. Z. (No. 3,756 S. H. Scudder Coll.) is in fairly good condition. It does not show the lines of elytral punctures which are faintly indicated in the type, but agrees in other characters.

DASCYLLIDAE.

PROTACNAEUS, gen. nov.

Form similar to that of *Aenaeus* or *Ectopria*, short, oblong ovate. Head of rather large size, antennae, in one sex at least, filiform. Anterior coxae contiguous. Middle coxae rather small, oblique, distinctly

but not widely separated. Hind coxae oval, transverse, contiguous or nearly so. Abdominal segments subequal except the first and last which are longer.

Type.—*P. tenuicornis*, sp. nov.

PROTACNAEUS TENUICORNIS, sp. nov.

Plate 4, fig. 5.

Form short, stout. Head incompletely preserved but of large size. Eye large, rounded. Antennae probably broken and with the joints of the proximal half not distinguishable as such, those of the distal half slender and about twice as long as wide. Prothorax broad at base, narrowed to apex the sides poorly preserved. Elytron, seen from beneath, showing traces of stria punctures, neither deep nor coarse, the striae moderately distant, punctures round, those of each row separated by about their own diameters. Underside of trunk not visibly sculptured. Legs wanting. Length, to tip of abdomen, 4.60 mm.

Described from one specimen.

Type.—No. 2,466 M. C. Z. Florissant, Col. (No. 9,227 S. H. Scudder Coll.).

Like the other Florissant Dascyllidae, this species fails to agree very well with the living forms. It seems to require a new genus for its reception. It belongs to the Eubriini near Acnaeus which occurs today on our Pacific coast.

MIOCYPHON, gen. nov.

Body form similar to that of the elongate species of Cyphon. Antennae widely separated at base, 11-jointed, basal joint obscured, second smaller than the third, third to seventh subequal, scarcely serrate, distinctly longer than wide, eighth to eleventh longer, though not excessively so, a little wider than those preceding. Coxae not well defined on account of portions of the legs remaining in place, obscuring the view, but the front pair were approximate or contiguous, the middle well separated, the posterior nearly or quite contiguous.

Type.—*M. punctulatus*, sp. nov.

MIOCYPHON PUNCTULATUS, sp. nov.

Plate 2, fig. 6-8.

Form elongate, oblong-elliptical. Head of moderate size, eye large, rounded, antennae slender, scarcely serrate, in life reaching only about to the base of the elytra. Prothorax broad, sides arcuate, base evidently much broader than the apex. Elytron broad, subtruncate at tip, the surface finely, irregularly, and sparsely punctulate, the punctures showing in places some disposition to form rows. Legs in too poor condition for description. Length, 8 mm.

Described from one specimen.

Type.—No. 2,467 M. C. Z. Florissant, Col. (No. 454 S. H. Scudder Coll.).

Although of a puzzling nature, it seems that the family Dascyllidae may be utilized as a place for this insect. The characters which have led me to this assignment are to be found in the form, texture, and punctuation, the coxal structure, and the length of the distal antennal joints. This last feature is not truly characteristic of the Dascyllidae but occurs there, while in most of the other families to which the fossil might at first sight be referred the distal joints are shortened. I do not find any characters sufficiently suggestive to give a clue as to which tribe the insect should enter.

ELATERIDAE.

EUCNEMIS ANTIQUATUS, sp. nov.

Plate 2, fig. 9.

Form subparallel, not very slender. Head crushed too badly for description. Antennae with the intermediate joints strongly serrate, approximately one half broader than long. Prothorax distorted, sculpture obscure. Elytra separately somewhat rounded at apices, the sculpture poorly defined and showing only faint traces of striation. Length, to elytral apices, 7 mm.

Described from one specimen.

Type.—No. 2,468 M. C. Z. Florissant, Col. (No. 10,997 S. H. Scudder Coll.).

This seems to be a member of the Eucneminae and I have chosen

the name of the typical genus to indicate the place of the species since there are no characters shown by the fossil which will serve as a basis for separation. The sculpture, though obscure, seems to have been rough like that of *Sarpedon* or *Hylochaes* but the antenna is more like that of *Eucnemis*.

BUPRESTIDAE.

DICERCA EURYDICE, sp. nov.

Plate 3, fig. 1.

Form fairly slender for this genus but a little less so than would be inferred from the figure, the left margin of the prothorax and elytron being broken off in the fossil. Head of normal size and aspect, surface rather finely granulate, eye, viewed from above, oblique. Pronotum narrowed posteriorly, sides imperfect, surface scabrous, roughened with ill-defined longitudinal ridges and grooves. Elytra scabropunctate and granulate with scattered irregular indications of raised lines and striae, giving the normal appearance of rough sculpture found in most of the modern species of *Dicerca*. The elytral apices are sharply pointed. Length, to abdominal tip, 16.20 mm.; of elytron, 10.40 mm.

Described from one specimen.

Type.—No. 2,469 M. C. Z. Florissant, Col. (No. 11,649 S. H. Scudder Coll.).

The aspect of this fossil is that of *Dicerca* but the pointed elytra are foreign to my experience with modern species of the genus. In the lack of other characters for separation I prefer to leave it here. The form and general features, aside from the one noted, seem much like those of the living *D. spreta*. The specimen is in reverse, so that the granules described represent punctures.

BUPRESTIS FLORISSANTENSIS, sp. nov.

Plate 3, fig. 2.

Form moderately stout, probably about as in the recent *B. aurulenta*. Head unnaturally extended, suborbicular, truncate behind, surface rather finely roughened. Antennae too poorly preserved for description. Prothorax much wider than the head, tapering from base to apex, the sides too badly damaged to allow of their shape being deter-

mined, surface roughened but without definable sculpture. Elytra simply rounded at apices, surface with very poorly preserved sculpture of striae which are moderately coarsely and closely punctured in single series. Legs partly displaced and nowhere fully displayed but what can be seen indicates that they are moderately stout for this genus. Length, as preserved, 23.60 mm., in life undoubtedly a little less since the body of the fossil had been distended by maceration.

Described from one specimen.

Type.—No. 2,470 M. C. Z. Florissant, Col. (No. 8,890 S. H. Scudder Coll.).

My chief reason for referring this fossil to *Buprestis* rather than to *Chalcophora* or *Dicerca* is to be found in the nature of the elytral sculpture, since true generic characters are wanting. It is the largest of the *Buprestidae* from the Florissant shales, but unfortunately is not at all well preserved. Nevertheless it is easily recognizable at sight as a member of this family. Most likely it lived upon the pines which abounded on the shores of Lake Florissant.

BUPRESTIS SCUDDERI, sp. nov.

Plate 3, fig. 3.

Form only moderately elongate or even somewhat stout. Head large, front with a deep indentation having a raised center, the remainder of the surface with fine crowded granules in fairly high relief. Prothorax about one and one half times as wide as long, sides apparently imperfect but, as preserved, nearly straight as if the thoracic apex and base were about equal. Basal margin sinuate each side. Pronotum covered with moderately closely set granules, more crowded towards the sides, rounded like those of the head but a little coarser and less in relief. Longitudinal median line present, not deep and possibly adventitious. Elytra sinuate along the exterior margin, truncate at apex, surface with very fine, sharp, crenulate raised lines representing punctured striae, the intervening spaces granulate in more than one series. Legs wanting. Length, to elytral tip, 18.50 mm., in life about 2 mm. less; of elytron, 10.75 mm. Width of prothorax, 5.50 mm.

Described from one specimen.

Type.—No. 2,471 M. C. Z. Florissant, Col. (No. 11,663 S. H. Scudder Coll.).

Since the specimen is in reverse, the granules and raised lines noted in the description represent corresponding punctures and striae. It does not seem to be very closely related to any of the recent North American species of the genus although these furnish among themselves such a variety of sculpture on the upper surface of the body.

MELANOPHILA HANDLIRSCHI Wickham.

This seems to be the most common buprestid of the Florissant shales. The present collection contains six specimens, one with counterpart, No. 2,476-2,482 M. C. Z. (No. 406, 502, 6,388, 8,404, 12,488, 16,356 and 16,357 S. H. Scudder Coll.). The first noted example is remarkable for its beauty and the perfection of preservation.

MELANOPHILA COCKERELLAE Wickham.

Represented by two specimens, one of which, No. 2,474 M. C. Z. (No. 15,077 S. H. Scudder Coll.), is 2 mm. longer than the type, while the other, No. 2,475 M. C. Z. (No. 5,727 S. H. Scudder Coll.), exceeds the original measurement by less than 1 mm.

ANTHAXIA EXHUMATA Wickham.

One poor specimen, No. 2,472 M. C. Z. (No. 1,855 S. H. Scudder Coll.).

CHRYSOBOTHRIS SUPPRESSA, sp. nov.

Plate 3, fig. 4.

Preserved in ventral aspect and therefore not displaying important features of sculpture. Outline similar to that of the recent *C. floricola*. Prothorax hardly differing in width at base and apex, sides almost straight, flanks with moderately large, rounded, shallow, often confluent punctures, the prosternum with the punctuation so strongly confluent as to form transverse grooves. Meso- and metasternal side-pieces sculptured about like the prothoracic flanks, the abdominal punctures finer and more widely separated. Margin of last ventral not serrulate. Anterior tibia curved but not visibly enlarged at apex though the preservation is not good enough to be sure. Length,

exclusive of the extruded sex organ, 9.20 mm.; of the elytra, about 6.50 mm. Width of prothorax, 3.25 mm.

Described from one specimen.

Type.—No. 2,483 M. C. Z. Florissant, Col. (No. 6,898 S. H. Scudder Coll.).

Very much smaller than the Florissant fossil *C. haydeni* and with relatively shorter elytra than *C. gahani*. I think there is no doubt of its being a true *Chrysobothris*, but am unable to suggest its affinities with any of the numerous living North American species.

CHRYSOBOTHRIS COLORADENSIS, sp. nov.

Plate 3, fig. 5.

Form stout. Head wanting. Pronotum not in very good condition but apparently broadest near the base, finely and rather closely but not deeply punctate, without the reticulate effect of *Anthaxia*. Elytra bluntly pointed at apex, outer edges not serrate, punctuation fine and quite sparse though not well preserved. Front femur moderately stout, not visibly toothed, tibia, though broken at tip, evidently a little curved. Middle tibia distinctly arcuate, the tarsal joints longer than normal in recent *Chrysobothris* but their articulations are not certainly definable. Length, from front margin of prothorax to elytral apex, 4.75 mm.

Described from one specimen.

Type.—No. 2,484 M. C. Z. Florissant, Col. (No. 3,733 S. H. Scudder Coll.).

Evidently a buprestid and probably a *Chrysobothris* with the facies of the recent *C. atrifasciata* or *C. ulkei*. It is small for the genus but several of the recent species are of practically the same size.

PTOSIMA SILVATICA, sp. nov.

Plate 3, fig. 6.

Form not very elongate. Head damaged so as not to exhibit its true shape. Prothorax very short, base bisinuate, punctuation fine and sparse on the disk, stronger and crowded on the sides, everywhere shallow. Elytra broken at apex, finely and regularly striatopunctate, the striae impressed, stria punctures elliptical or elongate, well separated.

rated, interspaces broad, flat or nearly so. Legs wanting. Length, as preserved, 5.60 mm., in life somewhat greater.

Described from one specimen.

Type.—No. 2,473 M. C. Z. Florissant, Col. (No. 11,731 S. H. Scudder Coll.).

At first sight, this insect resembles an *Acmaeodera*, but cannot enter that genus on account of the distinct mesoscutellum and separate elytra. Behind the mesoscutellum is a narrow wedge-like sclerite, probably equivalent to the "second scutellum" of *Chlamys*, but there is no way of determining whether it was visible during life of the fossil, when the elytra were closed. A similar structure is seen in the Florissant fossil which I described some time ago under the name *Acmaeodera schaefferi*, but my figure of that species does not show the line of division between the two parts. *Ptosina gibbicollis*, our common North American representative of the genus, exhibits the same arrangement in about the same proportions, but it is necessary to open the elytra to see it. Since the size, form and sculpture of *P. silvatica* are similar to those of *P. gibbicollis*, I have assumed them to be congeneric if the lines are not too closely drawn. It will be better to consider that both of the Florissant insects which I have described under *Acmaeodera* (*A. schaefferi* and *A. abyssa*) belong rather to *Ptosina*, though they differ in sculpture of the elytra.

AGRILUS PRAEPOLITUS, sp. nov.

Plate 3, fig. 7.

Form only moderately elongate, less so as a fossil than in life on account of crushing by pressure. Head large, transversely suborbicular, longitudinally finely striate anteriorly, occipital region minutely closely punctulate. Antennae moderately serrate but very poorly preserved. Pronotum, as preserved, flattened so as to increase the apparent width which is equal to twice the length, apex broader than the base which is distinctly bisinuate, sides rather weakly arcuate, front angles prominent, the left hind one with a strong arcuate carina. Surface not very coarsely but deeply punctured, the punctuation close and transversely confluent so as to form a reticulate pattern of intervening raised lines. Scutellum broader than long, not triangular but with a narrow posterior lobe, distinctly transversely carinate. Elytra not or scarcely sinuate along the outer margin, apices merely

bluntly pointed, sculpture a distinct but not coarse scabrous punctuation, vestiture fine. Legs not preserved. Length, 7 mm.

Described from one specimen.

Type.—No. 2,485 M. C. Z. Florissant, Col. (No. 5,359 S. H. Scudder Coll.).

Very few of the Florissant fossils are so well preserved as this little buprestid. It is a remarkably satisfactory agrilid type and exhibits many of the characters used in our tables for the separation of recent species of this genus. By comparison with specimens of the common living North American *Agrilus politus*, the fossil is so nearly identical as to be separable with difficulty. It is entirely within the bounds of possibility that *A. praepolitus* infested the willows of the ancient lake shore.

LAMPYRIDAE.

MIOCAENIA, gen. nov.

Form of *Caenia* but the pectinations of the antennae are apical in origin instead of basal.

Type.—*M. pectinicornis*, sp. nov.

MIOCAENIA PECTINICORNIS, sp. nov.

Plate 5, fig. 1-2.

Body elongate, subparallel. Head small, eyes destroyed. Antennae two thirds the length of the entire body, the joints external to the second rather strongly pectinate except the last which is simple. Prothorax small, not projecting over the head. Elytra long, sculpture obscure. Legs wanting. Length, 6.15 mm.

Described from one specimen.

Type.—No. 2,486 M. C. Z. Florissant, Col. (No. 6,994 S. H. Scudder Coll.).

Superficially this insect looks very much like *Caenia dimidiata* of our eastern and northern states, but the structure of the antennae is different. The European genus *Drilus* approaches it in this respect, but has a different body form. In the lack of knowledge of a recent genus which will acceptably receive the fossil, I have proposed a new name.

PODABRUS FRAGMENTATUS, sp. nov.

Plate 4, fig. 1.

Form elongate. Head of moderate size, rather strongly narrowed behind the eyes which are of good size and apparently shortly elliptical, muzzle projecting. Antennae long, slender, if extended backward they would reach a point three fifths from the elytral base, joints not at all serrate, those near the middle nearly three times as long as broad. Prothorax crushed but evidently not very wide. Elytra long, tips bluntly rounded, sculpture fine and obscure. Legs poorly preserved but the pieces remaining show them to have been slender. Length, as preserved, 12.75 mm.; to elytral apices, 9.85 mm.; of elytron, 6.85 mm.

Described from one specimen with counterpart.

Type.—No. 2,487, 2,488 M. C. Z. Florissant, Col. (No. 4,218 and 4,638 S. H. Scudder Coll.). Two other specimens, No. 2,489, 2,490 M. C. Z. (No. 69, 2,546 S. H. Scudder Coll.) also belong here.

It is hard to find any very definite characters to separate this species from *P. florissantensis* but the latter has a larger head, longer elytra, and shorter antennal joints.

PODABRUS WHEELERI Wickham.

Three specimens No. 2,491, 2,492, 2,493 M. C. Z. (No. 5,946,—? —? S. H. Scudder Coll.) belong here. It is probable that the example No. 2,494 M. C. Z. (No. 11,165 S. H. Scudder Coll.) also belongs here.

PODABRUS FLORISSANTENSIS, sp. nov.

Plate 4, fig. 2.

Form fairly stout. Head rather long in front of the eye which is slightly elliptical, the greater axis nearly longitudinal. Prothorax crushed but evidently much wider than long, the front margin straight. Elytra long, quite narrow, apices rounded, surface finely scabrous with traces of narrow costae. Legs too poorly preserved for description. Length, to elytral apices, assuming the head to be brought into its normal position, 10.10 mm.; of elytra, 7.35 mm.

Described from one specimen.

Type.—No. 2,495 M. C. Z. Florissant, Col. (No. 8,947 S. H. Scudder Coll.).

At first I had taken this insect to be an *Epicauta*, but that reference is invalidated by the form of the eye. Further examination indicates that it is allied to *Podabrus* and for the present I have placed it in that genus.

TELEPHORUS HESPERUS, sp. nov.

Plate 4, fig. 3.

Form moderately elongate. Color apparently yellowish, the sides and sutural region of the elytra darker. Head of normal size. Eyes (not shown in the type) rather small, rounded. Antennae slender, long, not reaching the elytral tips, the joints not at all serrate. Prothorax rounded at the sides and apex, broader than long. Elytra subparallel, apices rounded, surface sculpture fine, about obliterated, without visible costae. Legs slender. Length of type, to apex of elytra, 4.50 mm.; of other specimens, ranging to a little over 5 mm.

Described from six specimens.

Type.—No. 2,496 M. C. Z. Florissant, Col. (No. 9,376 S. H. Scudder Coll.). Other specimens are No. 2,497–2,501 M. C. Z. (No. 2,243, 5,065, 5,515, 6,048, 12,769 S. H. Scudder Coll.).

A small species not unlike the recent North American *T. scitulus* but probably with the elytral markings more distinct. In some of the specimens of the fossil the elytral stripe is poorly defined, the one chosen as the type and serving for the figure being the best marked.

POLEMUS CRASSICORNIS, sp. nov.

Plate 4, fig. 4.

Form fairly stout. Head nearly concealed. Antennae stout but scarcely serrate, not quite reaching the middle of the elytra. Prothorax rounded at sides and apex and slightly at the base. Elytra covering the abdomen, apices rounded, sculpture obscure but with faint signs of costae. Legs rather long and slender. Length, 8.40 mm.

Described from one specimen.

Type.—No. 2,502 M. C. Z. Florissant, Col. (No. 930 S. H. Scudder Coll.).

I have placed this fossil in *Polemius* rather than in *Telephorus* chiefly on account of the heavy antennae. The posterior half of the elytra is darker than the anterior but I am not at all sure that this is due to any difference in color in the living insect, it seems more likely the result of scaling off of a portion of the metamorphosed chitin when the stone was split.

TRYPHERUS ABORIGINALIS Wickham.

Two specimens, one with counterpart, No. 2,503–2,505 M. C. Z. No. 8,586, 8,499 and 8,651 S. H. Scudder Coll.). They show no important characters not brought out in the original description.

MALACHIIDAE.

COLLOPS PRISCUS, sp. nov.

Plate 5, fig. 3–4.

Form, in life, apparently similar to that of the recent *C. bipunctatus* but as preserved the abdomen is greatly distended, presumably by maceration. Head with rather indistinct outline, sculpture not discernible, antennae short, stout, first joint elongate, second much longer and distorted by the production of the inner apical angle, the third, fourth, fifth; sixth, and seventh, subtriangular, moderately serrate, eighth damaged, remainder not definable. Prothorax about as long as the head, no defined sculpture. Elytron nearly smooth but with a sparse covering of rather long black hairs. Legs slender. Length, as preserved, 5.70 mm.; of elytron, 3.60 mm.

Described from one specimen with counterpart.

Type.—No. 2,506, 2,507 M. C. Z. Florissant, Col. (No. 8,140 and 9,307 S. H. Scudder Coll.).

The form, vestiture, antennae, and abdominal segmentation all point to the above generic reference. Measured from the front of the head to the elytral apex, this insect about equals in size the living North American *C. hirtellus* which occurs from New Mexico to Nevada. Washington, and the Saskatchewan.

COLLOPS DESUETUS, sp. nov.

Plate 5, fig. 5.

Smaller than *C. priscus*. The specimen is too poorly preserved to make out much besides the proportions of the head, prothorax, and elytra, which are about as in the recent *C. vittatus*. Eye rounded. Antennae and legs wanting. The elytra are scabrous and with a sub-sulcate effect such as is faintly indicated in several of the recent North American species of this genus. Length, from front of head to tip of abdomen, 4.45 mm.; to tip of elytra, 4.10 mm.

Described from one specimen, with counterpart.

Type.—No. 2,508, 2,509 M. C. Z. Florissant, Col. (No. 12,020 and 12,021 S. H. Scudder Coll.).

In general appearance, this insect is so much like a *Collops* that I feel fairly confident of the generic reference. It is likely that No. 2,510 M. C. Z. (No. 11,273 S. H. Scudder Coll.) represents the same species.

COLLOPS EXTRUSUS, sp. nov.

Plate 5, fig. 6–7.

Of the usual subovate form, broader posteriorly. Head relatively rather small, rounded, antennae weakly serrate and without much modification of the basal joints. Prothorax wider than the head but too much crushed for description. Elytra broader behind, surface not well preserved but showing no sulcations and apparently with traces of hairs. Legs, so far as shown, slender. Abdomen distended, probably abnormally, so as to reach far beyond the elytra, the segments banded with brownish as shown in the figure. Length, to tip of abdomen, 8.15 mm.; of elytra, 4.60 mm.

Described from one specimen, with counterpart poorly preserved.

Type.—No. 2,511, 2,512 M. C. Z. Florissant, Col. (No. 13,620 and 13,642 S. H. Scudder Coll.).

Not so well preserved as the specimen of *Collops priscus*, but apparently a female of this genus or of one nearly related. The antenna is unfortunately not well preserved at base, and I am not sure whether the appearance of a short second joint is due to erosion of what shows as the third in the figure. In recent species of *Collops* the second

metathorax with shallow, rather fine punctures, visible only in certain lights, abdominal segments more finely punctulate and with short hairs. Legs wanting. Length as preserved, to tip of abdomen, 7 mm., in life somewhat less since the body is abnormally distended.

Described from one specimen.

Type.—No. 2,519 M. C. Z. Florissant, Col. (No. 7,651 S. H. Scudder Coll.)

There seems to be no way of separating this insect from *Necrobia* except on the basis of the less pronounced antennal club and I do not feel justified in founding a new genus on this one character. The coxal and abdominal structures, as well as the size and facies, agree with *Necrobia*. The punctuation of the underside is less conspicuous in the fossil. The exposed elytral epipleura shows fairly strong punctures.

PTINIDAE.

ERNOBIUS EFFETUS, sp. nov.

Plate 6, fig. 1.

Form moderately elongate, subparallel in side view. Head fairly large, eye elliptical, antennae wanting. Prothorax probably damaged along the back but as preserved the dorsal surface is not arched; the apex projects over the head but not sufficiently to entirely conceal it from above. Elytra with only very faint signs of shallow striae visible in certain lights. Legs short and fairly slender. Length, from front of pronotum to elytral apex, 4 mm.

Described from one specimen.

Type.—No. 2,520 M. C. Z. Florissant, Col. (No. 2,647 S. H. Scudder Coll.). It is probable that No. 2,521 M. C. Z. (No. 9,440 S. H. Scudder Coll.), is the same species.

The sculpture of the surface of this insect is extremely fine and visible only under high power. It consists of a minute but close and sometimes confluent punctuation, stronger on the prothorax, the meso- and metasternal side-pieces and the base of the elytra. In size, the present species is about equal to the recent *E. mollis* which is similar in form and sculpture. These characters offer the only basis for the generic reference.

XESTOBIUM ALUTACEUM Wickham.

One good specimen, No. 2,522 M. C. Z. (No. 7,500 S. H. Scudder Coll.), about .25 mm. shorter than the type.

OLIGOMERUS FLORISSANTENSIS, sp. nov.

Plate 6, fig. 2.

Form elongate, rather slender. Head of moderate size, minutely and closely punctulate, eye not defined, antennae wanting. Pronotum, in side view, subcuneiform, finely punctulate. Elytron long, very finely sculptured but with well-defined, sharp though narrow punctate striae, the punctures small, well impressed, longitudinally elliptical, those of the same row separated individually by something less than their own long diameters. Leg (only one being at all well shown); short and rather slender. Length, from front margin of pronotum to elytral apex, 4 mm.

Described from one specimen.

Type.—No. 2,523 M. C. Z. Florissant, Col. (No. 5,921 S. H. Scudder Coll.).

In size and outline, this beetle is about like *Ernobius effetus*, so similar in fact that allowing for the difference in thoracic outline which might be due to distortion I should have considered them as representing one species if it were not for the well-defined punctate striae of the elytra of the present insect. The nearly semicircular structure projecting on to the head near the anterior prothoracic margin seems to be not an eye but probably due to some imperfection in the stone. Of course the generic reference cannot be made with any great degree of certainty, but the fossil is not unlike the modern *O. obtusus* of eastern North America.

OLIGOMERUS (?) *DURATUS*, sp. nov.

Plate 6, fig. 3.

Form elongate. Head large, minutely punctulate and rugulose. Eye of moderate size, elliptical. Antennae wanting. Prothorax short, subcuneiform in side view, back scarcely arched, front margin apparently but little or not at all projecting, surface finely punctate but somewhat more coarsely than the head. Elytron long, the outer edge broken so that the relative proportions of length and breadth cannot be determined with exactitude, surface with faint evidence of obscure costation or striation, punctuation very fine and confused. Underside of body minutely punctulate, more strongly on the thorax than on the abdomen. Legs short and slender. Length, 4.25 mm.

Described from one specimen.

Type.—No. 2,526 M. C. Z. Florissant, Col. (No. 7,646 S. H. Scudder Coll.).

Probably not a true *Oligomerus* since the head is larger and the prothorax shorter and higher than in the modern species. For the present, I prefer to leave it here rather than erect a new genus for its reception.

ANOBIUM DURESCENS Scudder.

I have referred to this species a specimen, No. 2,527 M. C. Z. (No. 12,026 S. H. Scudder Coll.). It differs from the type in being 1 mm. longer, (length 4.50 mm., as compared with 3.50 mm. in the original), but I can find no other tangible difference.

BOSTRICHIDAE.

AMPHICERUS SUBLAEVIS, sp. nov.

Plate 6, fig. 4.

Form stout. Head large. Prothorax, in side view, subcuneiform, the back not much arched, surface comparatively smooth and without defined asperities. Elytron a little more than twice the prothoracic length, faintly substriate, otherwise nearly smooth, without teeth on the declivity. The only leg showing is one of the hind pair, which is very small and relatively weak. Length, from front of pronotum to apex of elytra, 5.85 mm.

Described from one specimen.

Type.—No. 2,524 M. C. Z. Florissant, Col. (No. 14,250 S. H. Scudder Coll.).

This is a little larger than *Xylobiops lacustre* and is much smoother. The fossil *Dinoderus cuneicollis* is much smaller. I have placed it in *Amphicerus* in spite of the lack of prothoracic armature because of the general likeness to the New Mexican *A. brevicollis*, which, judging from material received from Prof. D. E. Merrill, is the female of *A. grandicollis*.

XYLOBIOPS LACUSTRE Wickham.

One specimen, No. 2,525 M. C. Z. (No. 14,247 S. H. Scudder Coll.).

SCARABAEIDAE.

OXYOMUS NEARCTICUS, sp. nov.

Plate 7, fig. 1.

Form oblong-oval, moderately stout. Head roughly and coarsely punctured, clypeus broadly arcuate, not angled nor emarginate. Prothorax broader than long, sides arcuate but not sufficiently well preserved to admit of exact description, disk with coarse, close, deep, cribrate punctures which are circular or elliptical in outline and leave a well-defined, nearly straight but narrow, almost cariniform median longitudinal line. Scutellum triangular. Elytra broader behind the middle, conjointly rounded at tip, strongly costate, the costae narrow, alternate ones better defined, the intervening grooves, which represent the striae, each with a row of strong, deep, transversely elliptical punctures. The stronger costae appear to reach the elytral tips, while the weaker are somewhat abbreviated apically. Legs moderately stout, but none are sufficiently perfect for description. Length, 3.20 mm.

Described from a single specimen.

Type.—No. 2,528 M. C. Z. Florissant, Col. (No. 222 S. H. Scudder Coll.).

The small size, coarse cephalic and thoracic sculpture, and costate elytra lead me to place this pretty aphodiid in *Oxyomus*. The genus is now known in North America only from the introduced European *O. porcatus*. I have compared the fossil with European specimens of *O. pilpestris*, received years ago from Dr. Natterer, and find that the former differs in having a more strongly punctate head, the median thoracic line not sulcate, and the elytral costae much more distinctly alternating in height. Both agree in the possession of a vague ante-median lateral pronotal impression. The coarse sculpture distinguishes *O. nearcticus* at once from all of the other Florissant Aphodiini.

ATAENIUS PATESCENS Scudder.

Seven specimens are assigned here, bearing the No. 2,529–2,535 M. C. Z. (No. 8,411, 8,571, 10,160, 10,408, 11,796 S. H. Scudder Coll.) and two in which the numbers are illegible or wanting). I have included under this name all the aphodiids of a little over 4 mm.

in length with distinct, simple, impunctate striae. It is possible that more than one species is included in the material but there seems to be no sure means of separation with the specimens at hand.

ATAENIUS RESTRUCTUS Wickham.

Three specimens, No. 2,536-2,538 M. C. Z. (No. 2,471, 2,502, 11,298 S. H. Scudder Coll.). They agree with my type in size and form and I think it best to assume their identity, although in some lights the elytral striae seem to show signs of punctures. The specimen bearing Scudder's number 2,502 exhibits the hind tibiae very nicely and from the slender structure of these parts and the lack of distinct transverse ridges it seems wise to assign the species to *Ataenius*, though I had first described it as an *Aphodius*.

APHODIUS Illiger.

The removal of my *A. restructus* to the genus *Ataenius* leaves six described species of *Aphodius* from the Florissant shales. Two new ones are found in the present collection, both readily distinguishable from those previously known. While mammal remains are practically unknown at Florissant, it is probable that the region adjacent to the old lake was well populated with the numerous ungulate and other types of mammals known to abound during the Tertiary times. It is a matter of common knowledge that some of the species of recent coprophagous Scarabaeidae select the dung of one or more species of mammal as food, in place of promiscuous feeding. Putting together the known abundance of ungulates in the Tertiary period and the selective habit of dung-eating beetles, it is reasonable to assume that the great specific development in *Aphodius* at Florissant was correlated with a plentiful supply of mammalian dung of different kinds. It appears to me likely that a good many of these old *Aphodii* became extinct along with the mammals that formed the sources of their food supply. All of these Florissant fossil *Aphodii* belong to the division of the genus with short scutellum — the same section that is most abundant in North America today. None of them are especially peculiar in any way, though their specific characters are well marked. Some of them must have occurred in considerable numbers if we may judge by the frequency of their remains in the shales.

APHODIUS SHOSHONIS Wickham.

This is represented by one specimen, No. 2,549 M. C. Z. (No. 7,720 S. H. Scudder Coll.). It agrees with my type.

APHODIUS ABORIGINALIS Wickham.

A fine specimen with counterpart, No. 2,551, 2,552 M. C. Z. (No. 13,611 and 13,645 S. H. Scudder Coll.). This corresponds to the type. Several others are too poor for certain determination, or else show only undersides, but belong to either the present species or to *A. granarioides*. They bear the No. 2,553-2,558 M. C. Z. (No. 8,032, 8,335, 8,369, 9,164, 10,334, 12,437 S. H. Scudder Coll.).

APHODIUS MEDIAEVUS, sp. nov.

Plate 6, fig. 5-7.

Form very short and stout for this genus, as much so as in the recent *A. hamatus*. Head poorly preserved, not showing the shape nor the sculpture sufficiently well for certain description but the clypeus appears to have been subtruncate anteriorly and there is no visible cephalic punctuation. Prothorax very broad, about twice as wide as long, sides arcuate, surface indistinctly and not coarsely punctured. Scutellum short. Elytra rather finely and very distinctly striate, the striae with well-marked punctures which are smaller and circular in the basal region, becoming larger and slightly transverse on the disk as indicated by the figure. Legs stout but not well preserved excepting one belonging to the front pair which shows the sharp and strong tibial teeth very nicely. Length, as preserved, 4.15 mm.

Described from a single specimen with counterpart.

Type.—No. 2,539, 2,540 M. C. Z. Florissant, Col. (No. 4,901 and 5,395 S. H. Scudder Coll.).

A very easily recognized species, at once differentiated from any of the other Florissant forms by the moderate size, the broad outline, the indistinct thoracic punctuation and the well-marked punctures of the simple elytral striae.

Several specimens are contained in the collection, No. 2,541-2,546 M. C. Z. (No. 433, 494, 8,523 and 9,616, 13,605 and 13,666 S. H. Scudder Coll.). These agree well with the type. It is probable that No. 2,547, 2,548 M. C. Z. (No. 2,328, 7,785 S. H. Scudder Coll.), also belong here.

APHODIUS SENEX, sp. nov.

Plate 6, fig. 8.

Form moderately stout, similar to that of the modern *A. fimetarius*. Clypeus broadly rounded, not emarginate anteriorly. Head moderately coarsely and confluent but not strongly punctate at sides, the sculpture of the front either weak or not defined. Prothorax about one and three fifths times as broad as long, sides almost regularly arcuate, a fairly well-defined median line, punctuation not close, but the condition of the stone is such that a sparse punctuation would not be distinguishable. Scutellum short, punctured closely and confluent somewhat like the sides of the head. Elytra with broad distinct striae in which the sides are deeper than the middle, giving each stria a duplicate appearance, stria punctures visible, but weak. Legs wanting except one defective fore tibia which is omitted from the drawing and shows nothing beyond the fact that it is toothed. Length, 8 mm.

Described from a single specimen.

Type.—No. 2,550 M. C. Z. Florissant, Col. (No. 9,432 S. H. Scudder Coll.).

Differs from all the other Florissant Aphodii except *A. florissantensis* by the duplicate striae and from that species in being very much larger. In size it is surpassed only by *A. laminicola*, which has simple striae.

APHODIUS LAMINICOLA Wickham.

This large species seems to have been not at all uncommon. It is represented by seven specimens, one with counterpart, No. 2,559-2,566 M. C. Z. (No. 6,118, 7,735, 8,028 and 8,474, 8,490, 11,287, 11,786, 14,403 S. H. Scudder Coll.).

Plate 7, fig. 2.

Form similar to that of most of the recent North American species. Head of moderate size, the clypeus truncate anteriorly and with rounded angles as in *H. trifasciata*. Prothorax much broader than long, widest about the middle, narrowing to the apex and less strongly to the base, sculpture not definable. Elytra, conjointly, distinctly broader than long, the apices subtruncate, disk with rather ill-defined longitudinal sublateral striae which do not show punctures. Abdominal segments subequal except the last which is longer. Length 9.75 mm.

Described from a single specimen.

Type.—No. 2,567 M. C. Z. Florissant, Col. (No. 8,001 S. H. Scudder Coll.).

The form of the head and thorax corresponds very well with our modern species of the genus and so does that of the elytra if due allowance is made for the flattening of the humeral deflexed region. The striation is about the same (though better marked in the fossil) as that shown by specimens of *H. trifasciata* var. *tristis*. Some of the other recent species have similar striation. In order to account for the abdominal segmentation it is necessary to assume that the sutures of the underside show through—a suggestion which is not in the least improbable since those of the meso- and metathoracic regions appear dimly through the elytra. Unfortunately the legs are entirely wanting.

SERICA ANTEDILUVIANA Wickham.

Plate 6, fig. 9.

A beautiful specimen of a small *Serica*, preserved in dorsal view, is contained in this series. It is only a quarter of a millimeter shorter than my type of *S. antediluviana*, which was preserved in side view, and agrees with it in all the visible characters. In the Scudder specimen the punctuation is better exhibited and is seen to be of the subrugose transverse type shown in the recent *S. trociformis*. The spurs of the hind tibiae are long and slender but the limits of the tarsal joints, excepting the first, are not clear enough to admit of description. I give a figure of this specimen to supplement that of the type. No. 2,568 M. C. Z. Florissant, Col. (No. 11,797 S. H. Scudder Coll.).

Body outline resembling that of *Anomala*. Pronotum short, the base broadly, squarely truncate. Scutellum distinct, small. Sculpture fine, body hairy above. Pygidium uncovered. Legs moderately stout, hind tarsus, including the claws, nearly as long as the tibia, the first four joints subequal, rather slender, claws simple.

Type.—*M. tristoides*, sp. nov.

MIOLACHNOSTERNA TRISTOIDES, sp. nov.

Plate 8, fig. 1-3.

Outline, as preserved, ovate, somewhat pointed behind. Head not well displayed, apparently rather small, the vertex moderately, finely, and sparsely punctured. Prothorax finely, sparsely, and rather regularly punctate, clothed with long light colored hairs which do not interfere with a clear view of the sculpture. Basal truncation wide, equal to about three fifths of the greatest pronotal width. Scutellum punctured like the pronotum. Elytra strongly narrowed posteriorly, confusedly, and a little more coarsely, and much less deeply punctured than the prothorax, similarly clothed with hairs, the punctures spaced about as on the pronotum. Exposed pygidial surface obscurely punctate. Hind tibia hairy. Length, to tip of elytra, 7.50 mm.

Described from one specimen.

Type.—No. 2,569 M. C. Z. Florissant, Col. (No. 13,668 S. H. Scudder Coll.).

In sculpture and vestiture this insect is not very different from the recent *Lachnosterna tristis*, but the absolutely simple claws preclude the reference to this genus. The basal pronotal truncation is much more pronounced than in *Lachnosterna*. The safe course seems to lie in the erection of a new genus. The only point not alluded to in the description, which calls for remark, is the appearance of a long rather stout spine on the poorly preserved front tibia, and while I have shown this in the figure and detail I am by no means certain of its being a true character. I have presumed this species to be a melolonthide and suggest that it be placed near *Lachnosterna* for the present.

Plate 6, fig. 10.

Form elongate and quite slender. Surface of body weakly sculptured, the elytra without the strong rows of punctures and costiform interspaces characteristic of *Diploptaxis*, which this insect somewhat resembles in outline. Legs long and slender but not sufficiently well preserved to show details of the tibial dentation nor the structure of the claws. Length, 10.65 mm.

Described from one specimen.

Type.—No. 2,570 M. C. Z. Florissant, Col. The original number of the S. H. Scudder collection is illegible.

About all that can be said of the affinities of this insect is that it is a lachnosternoid type of small size, the shape reminding one of *Lachnosterna longitarsis* or of a slender *Listrochelus*. I think it a little more likely to have belonged to the latter genus and have so placed it, recognizing that the two genera are frequently almost indistinguishable, even in recent specimens. *Listrochelus* occurs today in the southern and western United States and in Mexico.

ANOMALA Koeppel.

Two species apparently belonging to this genus are found in the collection. While not very numerously represented in the United States at the present day, the genus *Anomala* is of great extent and wide distribution. It is also rather polymorphic.

ANOMALA EXTERRANEA, sp. nov.

Plate 7, fig. 3.

Form moderately elongate. Head strongly and closely punctured across the vertex, less so upon the occiput. Clypeus rounding in front, moderately punctate. Prothorax nearly twice as broad as long, a little narrower anteriorly, sides broadly arcuate, surface distinctly but sparsely punctate, a well-marked longitudinal median line (possibly due to a crack). Elytra moderately finely and closely punctate, the punctures subseriately arranged, some of the interstitial lines faintly costiform. Legs wanting in the type, and too poorly preserved

in the other specimen to warrant description. Length of type, from front of clypeus to the abdominal apex, 16.85 mm.; of elytron, 10 mm.
Described from two specimens, one with, the other without counterpart.

Type.—No. 2,571 M. C. Z. Florissant, Col. (No. 13,610 S. H. Scudder Coll.). Paratype, No. 2,572, 2,573 M. C. Z. (No. 8,162 and S,279 S. H. Scudder Coll.).

A good-sized species apparently belonging in the group with the elongate forms which are rather abundant in Mexico and the southwestern United States. In the paratype the sides of the prothorax are more divergent posteriorly and the elytral punctuation is better shown, but I think there is no doubt of its specific identity with the type.

ANOMALA SCUDDERI, sp. nov.

Plate 8, fig. 4-6.

Form elongate, the abdomen probably unnaturally extended in the specimen at hand. As only the ventral view is shown, the characters of the head and prothorax are obscured. Elytron, (only one being preserved), nearly two and a half times as long as wide, apex broadly rounded, surface sculpture not showing through on to the underside and for that reason probably not strong. Legs moderately elongate and not very heavy, the tarsal joints rather stout and short, the claws simple or nearly so except that one of the middle pair is toothed near the base. Length, from front of head to abdominal apex, 9.25 mm.; of elytron, 5.30 mm.

Described from one specimen.

Type.—No. 2,574 M. C. Z. Florissant, Col. (No. 5,125 S. H. Scudder Coll.).

Though lacking any very characteristic features, the leg and elytral structures have led me to place this fossil in *Anomala*. The form, if we assume that the abdomen is unnaturally distended, was not unlike that of the modern *A. semilirida*.

LIGYRUS Burmeister.

This genus is represented by several species in North America at the present day, and the Scudder collection of Florissant fossils contains two. One of these has already been described, the other is undoubtedly new.

LIGYRUS EFFETUS, sp. nov.

Plate 6, fig. 11.

Preserved lying partly on the back, so as to give a view of the side and a portion of each of the dorsal and ventral surfaces, but the condition is too poor to allow the sculpture to be described. Head small, as usual in this genus. Prothorax short and wide. Elytra exhibiting faint traces of striae, whether punctate or not it is impossible to say. Legs very short and stout, the hind tibiae broad, middle ones less so. Tarsal articulation not well defined, but the hind tarsus is at least as long as the tibia. Length, 13.75 mm.

Described from a single specimen with its counterpart.

Type.—No. 2,576, 2,577 M. C. Z. Florissant, Col. (No. 12,025 and 12,031 S. H. Scudder Coll.).

By the facies, this should belong with *Ligyru*s. It is a smaller species than *L. compositus* of these shales, being about equal in length to undersized examples of the recent *L. gibbosus*. Most probably, though not certainly, it differed from either of the above in having finer sculpture.

LIGYRUS COMPOSITUS Wickham.

Two specimens, No. 2,578, 2,579 M. C. Z. (No. 953, 13,614 S. H. Scudder Coll.) both poor, probably belong to this species.

STRATEGUS CESSATUS, sp. nov.

Plate 7, fig. 4.

Elytron castaneous, finely, sparsely, and irregularly punctate. There is a fine sutural bead, a similar exteromarginal one which is slightly less pronounced, and about nine fine discal striae, one of which is paired with the sutural bead while the others form four double series as shown in the figure. These striae are finely and distantly punctate. Length 17 mm. Width 8.80 mm.

Described from a single specimen, an elytron only.

Type.—No. 2,575 M. C. Z. Florissant, Col. (No. 9,047 S. H. Scudder Coll.).

After comparing this elytron with those of a great number of recent American and foreign genera, I have placed it in *Strategus* since it

corresponds more closely with *S. cressus* of our western states and Mexico than with anything else I have seen. The size of the two is almost identical and the nature of the sculpture, as well as the arrangement of the duplicate series is very similar. On account of the fineness and indistinctness of the punctuation of the striae and interstices I have not attempted to trace it in detail with the camera lucida except in one or two areas where it is particularly well preserved. The courses of the striae are, for the most part, shown on the figure in solid lines. The surface is alutaceous throughout, but this minute sculpture may be due to the texture of the stone.

CERAMBYCIDAE.

PHYMATODES Mulsant.

A species of this genus (*Phymatodes rolans*) has been described from the Florissant shales by Cockerell and Beutenmueller. The one which follows is almost too large for a *Phymatodes* and the reference is to be considered entirely provisional.

PHYMATODES MIOCENICUS, sp. nov.

Plate 9, fig. 1.

Represented by an elytron and a portion of a leg, the structure of the latter indicating that the insect does not belong to the Buprestidae, where similar elytral color patterns are not uncommon. Elytron elongate, in comparison with its width, the humeral region somewhat prominent, the outer margin sinuate behind the humerus, narrowing the elytron to about the middle whence it broadens for a short distance before narrowing again to the truncate unarmed apex. The surface is finely punctate or scabrous, the color dark, (brownish on the stone) crossed by two well-defined whitish bands, nearly at right angles to the suture, which divide the elytron into three almost equal parts. No hairs are visible upon the wing cover, but they show upon the tibia which is the only well-preserved portion of the leg. Length of elytron 10.50 mm. Width across posterior band 2.30 mm.

Described from one specimen with counterpart.

Type.—No. 2,580, 2,581 M. C. Z. Florissant, Col. (No. 431 and 1,454 S. H. Scudder Coll.).

The specimen indicates a longicorn beetle of a rather uncommon type of coloration, though approached more or less closely by recent species of various tribes. It seems worth while to give a specific name to the insect on account of its colorational interest. The pattern is almost a copy of that of the recent African *Ceropales bicincta*.

ELAPHIDION EXTINCTUM, sp. nov.

Plate 8, fig. 7.

Form stout. Head smaller than the prothorax, the jaws fairly strongly projecting, front finely, transversely, subrugosely punctulate. Eyes not defined. Antennae only obscurely exhibiting the proximal joints, the first stout, second apparently short, third long. Prothorax strongly transverse, sides not perfect but apparently moderately arcuate, surface rather finely but very closely and fairly deeply punctate, the punctures in front of the middle more or less confluent with a tendency to form transverse rugae, an impunctate area, probably a callosity, on each side. Elytra bluntly rounded at apex, more finely and sparsely punctate than the prothorax and with scattered, short, blackish hairs. The only leg shown is fairly slender. Length, from apex of jaws to that of abdomen, 11.35 mm.; of head and prothorax, 3.75 mm.; of the right elytron, 6.45 mm.

Described from one specimen with counterpart.

Type.—No. 2,582, 2,583 M. C. Z. Florissant, Col. (No. 11,780 and 12,034 S. H. Scudder Coll.).

By allowing some latitude of definition, this may have been an *Elaphidion*-like form of the same general appearance as the recent *E. moestum* but with callosities similar to those of the more typical species of the genus. Too little is shown to make the generic reference at all certain.

STENOSPHECUS PRISTINUS, sp. nov.

Plate 9, fig. 2.

Form elongate. Head large, longer than the prothorax. Antennae about as long as the entire body, basal joint large, second small, third longer than the fourth which is subequal to the fifth and to the sixth, remainder not definable. The sixth joint seems to show an apical spine but the margins of all the articles are poorly preserved, so that

this character is in doubt. Prothorax broader than long, arcuate at sides. Elytra long and narrow, apex without defined spine, but the stone is too rough to allow of certain judgment. Legs slender, thighs but little clavate. Length, 10.50 mm.

Described from one specimen.

Type.—No. 2,584 M. C. Z. Florissant, Col. (No. 11,289 S. H. Scudder Coll.).

The generic determination rests upon the facies. The form is that of the North American species of *Stenosphenus*, in fact the resemblance is so striking as to be manifest at the first glance. The stone on which the insect is shown is of such rough texture that the margins of the impression are all more or less blurred and it is impossible to be sure of the presence or absence of spines upon the antennae, knees, or elytra. The sculpture is entirely effaced. Because of the characteristic form of the beetle, I have thought it worth figuring and naming.

CLYTUS FLORISSANTENSIS, sp. nov.

Plate 10, fig. 1.

Form stout for this group. Head decidedly narrower than the prothorax, and, including the projecting mandibles, as long as wide. Mandibles subtriangular in outline, the external margins moderately strongly and regularly arcuate, their length equal to about one half that of the head. Cephalic sculpture rather weak, consisting of a not very close granulation and rugosity. Antennae incompletely preserved, but in life evidently reaching beyond the elytral tips, though not far, if at all, past the end of the abdomen, the first joint clavate, not very elongate, the second small, third distinctly longer than the fourth which is somewhat shorter than the fifth or sixth, the remainder incomplete or wanting, though a detached distal joint lying across one wing-cover indicates that those near the apex were somewhat greater in length. The third, fourth, and sixth joints, each show a strong inner apical spine. Eyes not definable. Prothorax much broader than the head, distinctly wider than long, and, owing to the strongly rounded sides without lateral spines, roughly transversely suborbicular in outline as is commonly the case in this group. Surface more strongly sculptured than the head, the sides with closely set regular circular granules of moderate size which become sparser and smaller on the disk and pronouncedly so on the anteromedian area. There

is evidence of a longitudinal medial callosity or raised line, stronger near the base. Elytra rather short, moderately tapering, apex truncate with a strong, sharp, external spine and a short sutural denticle. Surface rather finely punctate and granulate, this sculpture showing best in a light colored transverse band of irregular shape which extends across in the neighborhood of the basal third, this band having arcuate fore and hind margins which converge so as to make it narrower at the suture. In this light area are seen moderately long scattered black hairs. Abdomen, as preserved, long enough to extend beyond the elytral tips but perhaps unnaturally distended. Legs wanting, excepting one belonging to the posterior pair which is of only moderate length, the femur not strongly clavate, tarsal joints not expanded, the first scarcely equal to the next two. Length, from apex of mandibles to that of abdomen, 19 mm.; of elytron, excluding spine, 9.60 mm.; of seven proximal joints of antenna 8.40 mm. Width of elytron at middle of band, 3 mm.

Described from a single specimen with counterpart.

Type.—No. 2,585, 2,586 M. C. Z. Florissant, Col. (No. 11,795 and 12,419 S. H. Scudder Coll.).

In this specimen, the elytra and hind wings are both spread but the secondaries are not clear enough to make a description feasible. The drawing does not show the latter. The generic reference is to be understood as applying broadly but the insect shows so many features that are common in the Clytini as to make the assignment plausible at any rate. These characters are the large rounded prothorax, the shape of the head and mandibles, the rather short, spinose antennae, the short elytra, armed at apex and with transverse maculation, and the long abdomen. On the whole, I am inclined to place it near *Cyllene* rather than with any of the other genera that I know, though the hind tarsi are more like those of *Clytus* (for example the recent *C. lanifer*), but have chosen the term *Clytus* as being, in its broad sense, more inclusive. The anterior coxae are well separated and the prosternum is fairly broad.

GAUROTES STRIATOPUNCTATUS, sp. nov.

Plate 9, fig. 3.

Form rather robust. Head small, eyes not prominent. Antennae well over half the length of the entire body, not specially modified in any way, the joints beyond the second subequal as far as can be seen.

Prothorax broad at base, finely and inconspicuously punctured. Elytra wide at base, rather rapidly tapering to their apices which are conjointly rounded, disk with about ten to twelve striae of fine but sharp regularly spaced elliptical punctures, their long axes following the stria line, these punctures separated by about their own lengths. Interspaces relatively broad, flat, and smooth. Legs showing the femora of the hind pair and one of those of the front, not much thickened. Length, from front of head to abdominal apex, 9.25 mm.

Described from one specimen.

Type.—No. 2,587 M. C. Z. Florissant, Col. (No. 9,165 S. H. Scudder Coll.).

The best place for this beetle appears to be in *Gaurotes* with which it agrees in form and antennal structure and fairly well in sculpture which seems to be of a type rather uncommon in the *Lepturoides*. The recent *G. cyanipennis* has striatopunctate elytra but the punctures are finer and the striae more numerous than in the fossil.

LEPTURA NANELLA, sp. nov.

Plate 9, fig. 4.

Form elongate, fairly slender. Head of moderate size, eye elliptical, the outline hardly well enough preserved to show whether or not it is emarginate. Antenna a little longer than the head and prothorax, slender, not serrate, the joints rather indistinctly set off so as not to allow of separate description. Prothorax, in side view, campanulate, punctuation fine and poorly preserved. Elytron obtuse at tip, strongly and deeply but rather sparsely punctate, the punctures circular, separated on the basal region by about once or twice their own diameters but becoming much finer and more widely spaced apically. Sternal side-pieces nearly smooth. Abdomen finely and sparsely punctate, each puncture carrying a short fine hair. Legs apparently moderately stout. Length, 4.10 mm.

Described from one specimen.

Type.—No. 2,588 M. C. Z. Florissant, Col. (No. 9,682 S. H. Scudder Coll.).

A small species, about the size of the recent *L. haematites* and *L. molybdica*. It is smaller than any of the described Florissant forms of this genus, the nearest approach in this respect being *L. leidy* which reaches a length of 7.50 mm.

LEPTURA ANTECURRENS Wickham.

One specimen with counterpart, No. 2,589, 2,590 M. C. Z. (No. 13,624 and 13,672 S. H. Scudder Coll.). The condition is inferior to that of the type and no additional characters can be made out except that the present example is a very little larger.

LEPTURA PETRORUM Wickham.

Three specimens showing but one side, No. 2,591–2,593 M. C. Z., and another with counterpart, No. 2,594, 2,595 M. C. Z. (No. 8,985, 12,434, 14,164, 9,187 and 9,719 S. H. Scudder Coll.). Only the last is in good enough preservation to show the characteristic sharp elytral tip.

LEPTURA INGENUA, sp. nov.

Plate 10, fig. 2.

Form moderately stout. Head badly crushed but evidently rather large. Eyes not definable. Antennae slender, and, as preserved, reaching well behind the middle of the elytra. Prothorax also badly damaged by crushing, of a lighter color than the head, apparently reddish or yellowish. Elytra hardly at all tapering behind, surface coarsely and deeply, moderately closely punctured at base, the sculpture becoming finer posteriorly, fading out near the apices which are separately rounded, each with a longitudinal slightly oblique pale vitta showing on the darker background. Legs wanting. Length, 7.60 mm.

Described from one specimen.

Type.—No. 2,596 M. C. Z. Florissant, Col. (No. 6,382 S. H. Scudder Coll.).

Judging from the remains, this is a lepturid beetle of rather broad build. The elytral coloration is like that of the recent *Leptura vibex* of the eastern United States. Probably the antennae were pale or reddish like the prothorax, or perhaps a little darker.

PROTIPOCHUS, gen. nov.

Form approaching that of *Ipochus*. Head nearly as large as the prothorax. Antennae (with only ten joints preserved) reaching about

to the elytral tips, first joint stout, oval, longer than the third, second about two thirds the length of the third which is about two thirds as long as the fourth, fifth a little longer, sixth, seventh, and eighth a little shorter, ninth and tenth subequal to each other but not quite as long as the eighth. Pronotum without lateral spines. Elytra with rounded humeri, hind wings probably wanting or not functional.

Type.—*P. vandykei*, sp. nov.

PROTIPOCHUS VANDYKEI, sp. nov.

Plate 9, fig. 5: Plate 10, fig. 3-4.

Form resembling that of *Ipochus* or *Parmena*, surface finely transversely wrinkled on head and pronotum and with vestiture of rather short fine hairs. Head, including the jaws, a trifle longer than wide, eyes not definable but probably not prominent in life. Antenna moderately slender. Pronotum subequal at base and apex, sides regularly rounded without spine or tubercle, the greatest width near the middle where it exceeds the length by more than one-half. Scutellum moderate. Elytra nearly smooth, and, as preserved, not quite covering the abdomen, which, however, is probably somewhat abnormally distended by maceration. Femora clavate, stout, tibiae straight, finely hairy. Length, 5.70 mm.

Described from one specimen.

Type.—No. 2,597 M. C. Z. Florissant, Col. (No. 10,870 S. H. Scudder Coll.).

This is a very interesting and puzzling little longhorn. From the size of the head and the general facies, it would appear to belong to the Lamiinae. The antennae are hard to match, however, and on comparison with specimens, figures, and descriptions of numerous foreign and domestic genera I find nothing to agree exactly with them. They differ from those of most of the genera in this vicinity by the short third and long fifth joint and by the distal articles not decreasing rapidly in length. They seem to resemble those of *Michthysoma* in many respects, but the body form, thoracic armature, and coarse sculpture of that genus are entirely foreign to the fossil. I have finally concluded that *Protipochus* may go into Thomson's group *Parmenitae* of his subtribe *Dorcadionitae*. This group comprises genera from all of the continents and in North America is represented by the Californian genus *Ipochus*. Our fossil, while resembling *Ipochus* in outline,

differs in the proportions of the antennal joints, which, in *Ipochus*, decrease rapidly in length from the third to the fifth. The legs of *Protipochus* are rather short, the thighs strongly clavate, but owing to their showing through the specimen they are not represented in the gross figure. The detail will give an idea of the appearance of the middle leg.

I take pleasure in giving this species the name of Dr. Edwin C. Van Dyke of San Francisco.

LEPTOSTYLUS SCUDDERI, sp. nov.

Plate 10, fig. 5.

Form moderately elongate. Head with prominent jaws. Antennae slender, about one and three fifths times the length of the body, first joint long, subcylindrical, second short, third barely longer than the first, fourth subequal to the third, fifth, and sixth a little shorter, the remainder not distinctly separable. There is no visible antennal vestiture. Prothorax nearly twice as broad as long, sides arcuate with no defined spine nor tubercle. Elytra long, four and a half times the prothoracic length, strongly tapering from about the middle to the apices which are moderately sharply pointed but unarmed. Legs lacking except one which probably belongs to the middle pair; this is of moderate length and stoutness, tarsal joints ill defined. Length, from front of head to tip of abdomen, 11.35 mm.

Described from a single specimen.

Type.—No. 2,598 M. C. Z. Florissant, Col. (No. 929 S. H. Scudder Coll.).

The facies of this insect is entirely that of a *Leptostylus*, with which genus it agrees in the antennal and thoracic structures. The long antennae are in accord with those of the recent *L. biustus* and *L. terracolor*. The coloration seems to have been a mottling, arranged in irregular transverse bands, the best marked of which are in the form of two rather broad postmedian fasciae. It will be noted that the thoracic sides, as preserved, are not symmetrical, the left one showing about the same shape as in *L. biustus*, while the other is simply rounded.

PROTONCIDERES PRIMUS Wickham.

A specimen of a lamiid in this collection, No. 2,599 M. C. Z. (No. 13,594 S. H. Scudder Coll.), differs from my type of *P. primus* in just

dopterus in the nature of the elytral sculpture, this being more regular than in the recent North American species of *Colaspis*. By description, the present species is close to Scudder's *C. luti* but has relatively a much shorter prothorax. The figure of *C. luti* represents the abdomen as having six segments.

COLASPIS PROSERPINA, sp. nov.

Plate 11, fig. 2.

Form moderately elongate. Head without definable sculpture, eye elliptical, antenna poorly preserved but evidently long, about half the length of the body. Prothorax simply roughened, the separate punctures not distinguishable. Meso- and metasternum, their side-pieces and abdomen nearly smooth. Elytron roughened as if sculptured with partly obliterated irregular punctures after the manner of the recent *C. chrysis*, though less deeply. Legs too poorly preserved for description. Length, 6.10 mm.

Described from one specimen with counterpart.

Type.—No. 2,624, 2,625 M. C. Z. Florissant, Col. (No. 9,006 and 9,103 S. H. Scudder Coll.).

The generic reference is open to doubt. The insect seems to belong to the Eumolpini and near *Colaspis* but the sculpture is not matched in my series of recent forms. Most of the upper surface seems to be rough as in *C. chrysis* while the smooth side-pieces of the meso- and metasternum are like *Rhabdopterus*. True generic characters are lacking. It differs from the other Florissant species described as *Colaspis* in the combination of size and sculpture.

CHRYSOMELA VESPERALIS Scudder.

The specimen with counterpart, No. 2,627, 2,628 M. C. Z. (No. 11,264 and 13,649 S. H. Scudder Coll.), referred here, is shown in side view. It has altogether the form of *Chrysomela* and answers the details of the original description. The elytral punctuation in the present specimen is fine, a point not specified by Scudder though naturally inferable from his figure.

DIABROTICA BOWDITCHIANA, sp. nov.

Plate 11, fig. 4.

Form moderately elongate, broader posteriorly. Head, inclusive of jaws, about as long as the pronotum but not equalling it in breadth. Eyes rather large, rounded, very black and strongly outlined in the specimen, the remainder of the head being pale. Antennae slender, so far as shown, but only their basal portions are preserved. Pronotum about one and one half times as broad as long, sides weakly rounded, apex and base subequal. Elytra a little more than four times as long as the pronotum, finely punctate but with no signs of striae. Legs wanting. Length, 7 mm.

Described from one specimen.

Type.—No. 2,600 M. C. Z. Florissant, Col. (No. 3,467 S. H. Scudder Coll.).

The form was evidently not unlike that of the recent *D. 12-punctata*, though probably more slender. What remains of the elytral sculpture indicates a type more like that of *Trirhabda* than of any of the North American species of *Diabrotica* known to me though possibly it may be paralleled in some of the numerous South American representatives of the latter genus to which I have not access. The marmorate appearance seems due to the mode of preservation and not to the presence of any definite pattern. The prothorax is pale like the head. The present species is considerably larger than the Florissant fossil *D. excisa*.

It is named for Mr. Frederick C. Bowditch of Brookline, Massachusetts.

DIABROTICA UTEANA, sp. nov.

Plate 11, fig. 5.

Form similar to that of *D. bowditchiana* but a little more robust. Head rather large, antennae shorter and stouter than in most of the recent North American species. Pronotum damaged on one side, the other appears to be but slightly arcuate, the base broader than the apex. Elytra four and one half times as long as the pronotum, punctuation not distinct, but with some signs of striation near the outer margin. Legs wanting. Length, 4.35 mm.

Described from a single specimen.

Type.—No. 2,629 M. C. Z. Florissant, Col. (No. 507 S. H. Scudder Coll.).

Intermediate in size between *D. exesa* and *D. bowditchiana*, both from these shales.

DIABROTICA FLORISSANTELLA, sp. nov.

Plate 11, fig. 3.

Form similar to that of the living *D. longicornis*. Head of moderate size, the antennae showing only nine joints but these, if straightened out, would reach fully two thirds of the distance to the abdominal apex. Prothorax short, the form too much distorted for description. Elytra distinctly but finely longitudinally striate, the striae apparently not punctured. Legs normally slender. Length, 6 mm.

Described from one specimen.

Type.—No. 2,630 M. C. Z. Florissant, Col. (No. 9,566 S. H. Scudder Coll.).

While the species of Florissant fossils assigned to *Diabrotica* do not offer any very striking characters, it seems worth while to give this one a name since if fairly well preserved it will usually be separable from the other three by the long antennae and the distinct elytral striae.

DIABROTICA EXESA Wickham.

One specimen, No. 2,631 M. C. Z. (No. 9,193 S. H. Scudder Coll.).

TRIRHABDA SEPULTA, sp. nov.

Plate 11, fig. 6.

Form about like that of the recent *T. canadensis*. Head finely punctate, the punctures extensively confluent forming rugae. Antennae (possibly not preserved to the extreme tip) not quite as long as the elytra, the basal five joints proportioned about as in *T. convergens*. Prothorax with the disk scarcely visibly punctulate, sides only feebly arcuate. Elytra not at all striate, sculpture very minute. The entire upper surface of the body, including the antennal joints, is clothed with fine hairs, quite close-set on the elytra but less so on the head and pronotum. Legs wanting. Length, 7.70 mm.; of elytron, 5 mm.

Described from one specimen.

Type.—No. 2,632 M. C. Z. Florissant, Col. (No. 3,931 S. H. Scudder Coll.).

The characters shown are those of *Trirhabda*, though at first sight the specimen does not give the impression of belonging to that genus which is well represented in North America today. The size is about equal to that of *T. convergens* or *T. attenuata*.

TRIRHABDA MEGACEPHALA, sp. nov.

Plate 12, fig. 2.

Form elongate, parallel. Head large but not so wide as the prothorax. Eyes not well defined. Antennae damaged but showing six of the intermediate joints which are slender, not serrate, subequal, each a little more than twice as long as wide. In life, the antennae must have reached at least to the middle of the elytra and probably beyond that point. Prothorax badly injured but what remains shows it to have been not far from twice as broad as long. Scutellum small. Elytra four times as long as the prothorax, apices rounded. Abdomen showing five nearly equal segments which can be seen through the elytra. Legs wanting. Length, to elytral apices, 8.70 mm.; of the elytra 5.80 mm.

Described from one specimen.

Type.—No. 2,633 M. C. Z. Florissant, Col. (No. 3,166 S. H. Scudder Coll.).

The entire upper surface is minutely punctulate and finely hairy. The size and form are those of *Trirhabda* and it seems proper to place it here provisionally.

TRIRHABDA MAJUSCULA, sp. nov.

Plate 12, fig. 1.

Form moderately elongate. Head abnormally exserted, rounded, minutely punctulate and clothed with fine, dark, short, close hair. Eyes rounded, widely distant on the vertex. Antennae slender, not serrate, the individual joints too poorly preserved for description. Prothorax about one and one third times as broad as long, sides rounded, apex and base more or less truncate, surface minutely punctured and clothed similarly to the head. Scutellum broad.

Elytra nearly four times as long as the prothorax, minutely punctulate and clothed like the rest of the upper surface, apices bluntly pointed. Legs in very poor condition but apparently of normal thickness for the genus. Length, to elytral apices, 10.15 mm.; of elytron, 7.50 mm.

Described from one specimen.

Type.—No. 2,634 M. C. Z. Florissant, Col. (No. 11,266 S. H. Scudder Coll.).

Easily distinguished from either of the other two Florissant species by the much greater size which slightly exceeds that of the average specimen of the recent *T. canadensis*.

HALTICA RENOVATA, sp. nov.

Plate 13, fig. 2.

Form oblong-ovate, moderately stout. Head showing no characters except those exhibited by one antenna which is incompletely preserved but the five joints that remain, with the less defined remnants of two more, are slender as in recent species of the genus. The entire upper side is hidden in the type, but the elytral epipleural margin does not indicate striation nor heavy punctuation, and from this fact and the lack of sculpture showing through the body we may infer that the surface was merely finely punctulate or smooth. Anterior coxae large, probably not separated for their full length by the prosternum. Under surface of the trunk, including the abdomen, with no conspicuous sculpture. Hind legs with strongly swollen femora, the tarsi crossed so as to hide their articulations. Length, 5.25 mm.

Described from one specimen.

Type.—No. 2,635 M. C. Z. Florissant, Col. (No. 7,296 S. H. Scudder Coll.). Probably the same species is represented by No. 2,636, 2,637 M. C. Z. (No. 7,736, 3,507 S. H. Scudder Coll.).

It is possible that this is not a true *Haltica* but the general agreement is sufficiently close.

SYSTEMA FLORISSANTENSIS Wickham.

To this species probably belong four specimens, No. 2,638-2,641 M. C. Z. (No. 413, 3,430, 8,933, 9,615 S. H. Scudder Coll.). Like the type, they show the underside only.

PLECTROTETROPHANES, gen. nov.

General outline similar to that of *Plectrotetra* with which it agrees also in the open front coxal cavities, the distinctly striatopunctate elytra and the relatively slender hind femora. It differs especially in the short antennae and the much more abbreviated prosternum which allows the front coxal cavities to become widely confluent.

Type.—*P. hageni*, sp. nov.

PLECTROTETROPHANES HAGENI, sp. nov.

Plate 12, fig. 4.

Form moderately elongate but probably less so than would be inferred from the figure since the specimen is preserved lying on its back but somewhat askew. Head of moderate size, eyes rather large. Antennae short for the *Halticini*, second joint more than half as long as the third which is a little shorter than the first, the fourth to seventh subequal and of nearly the same size as the third. Prothorax much broader than long, the exact proportions not ascertainable since only a ventral view is shown and the sides are badly damaged. Prosternum short and pointed between the coxae, rugose in front of them and not visibly carinate. The prothoracic flanks are distinctly but finely and sparsely punctate. Mesosternum rather narrowly separating the middle coxae, side-pieces nearly smooth. Metasternum very finely punctulate. Elytra showing through the abdominal segments, strongly striatopunctate, the punctures circular and well separated, the striae subequidistant. Hind femur rather slender though possibly shown on edge. Abdomen finely punctulate. Length, 4.50 mm.

Described from one specimen.

Type.—No. 2,642 M. C. Z. Florissant, Col. (No. 8,125 S. H. Scudder Coll.).

While the nature of the preservation of this insect obscures many important features, it seems to be related to the Mexican genus *Plectrotetra* in the chief characters shown. None of our North American *Halticini* with striatopunctate elytra approach it nearly so closely. Compared with *P. dohrnii* from Jalapa, the fossil is more coarsely sculptured and the striae of punctures are much better marked. Most unfortunately the antennae are poorly shown, the joints beyond the seventh all being lacking or mutilated, but what remains of these

organs indicates that they were much shorter than in *Plectrotetra*. The left antenna of the fossil (supposing the insect to be in its natural position instead of upon its back) is taken to show the true structure, the other being very evidently distorted. The courses of the elytral striae, as they show through, are indicated on the figure by dotted lines except in a few places where the punctuation is set up strongly so as to allow of the delineation of the separate points with a camera lucida.

The specific name is given for the late Dr. Hermann A. Hagen, for many years in charge of the entomological department of the Museum of Comparative Zoölogy.

PROCHAETOCNEMA, gen. nov.

Form similar to that of the recent genus *Chaetocnema*, particularly the shorter species like *C. confinis*. Head large, antennae slightly thickened, 11-jointed, decidedly less than half as long as the body. Front coxae well separated by the strongly punctate prosternum, which is expanded at tip. Middle and hind coxae well separated, intercoxal process of first ventral blunt at tip. Ventral segments, as preserved, very unequal, the first extremely long, the three following short, the last nearly as long as the first. Hind femur much thickened, posterior tibia long, expanded apically and with a notch before the tip.

Type.—*P. florissantella*, sp. nov.

PROCHAETOCNEMA FLORISSANTELLA, sp. nov.

Plate 12, fig. 3.

Form robust. Head moderately large; antennae shorter and thicker than in the recent species of *Halticini* with which I have been able to compare it, joints beyond the first subequal. Prosternum moderately broad between the coxae and expanded at tip behind them, strongly punctured. Meso- and metasternal regions more finely punctate. Abdomen moderately strongly punctured at base, less so apically, an arcuate row behind each posterior coxa. Hind leg stout, the tibia strongly expanded apically, grooved on one face. Elytra punctatostriate, probably strongly, since the sculpture shows fairly well near the margin where it is usually more or less obscured if weak. Length, in somewhat bent attitude as preserved, 2.35 mm., in life probably not far from 2.50 mm.

Described from a single specimen in somewhat oblique ventral view. Type.—No. 2,643 M. C. Z. Florissant, Col. (No. 9,430 S. H. Scudder Coll.).

At first sight, I referred this beetle to *Chaetocnema*, but it differs in many points from that genus and from all others known to me. The broad punctured prosternum is like that of *Chaetocnema* but the antennae are more like those of *Crepidodera*, though shorter and thicker than in recent species. It is not possible to determine with certainty whether the front coxal cavities were open or closed, but, judging from the prosternum, probably the latter. The abdominal segmentation, if natural, is remarkable, but I think likely it is disarranged, to some extent at least, by telescoping. None of the North American genera have hind tibiae of this type and in the absence of knowledge as to the point of tarsal articulation this structure gives us no good clue to the location of the species though the groove reminds one of similar sculpture in *Dibolia*. On the whole, I should, for the present, place the genus in the neighborhood of *Chaetocnema*.

ODONTOTA Chevrolat.

This genus is the only one of the *Hispini* known from the Florissant shales. Today the group is not very strongly represented in temperate North America, our fauna comprising about thirty-five species, twelve of which belong to *Odontota*.

ODONTOTA AMERICANA, sp. nov.

Plate 11, fig. 7-9.

Form rather short for this genus. Head and prothorax rough but the sculpture is not well defined. Elytra with deep wide striae, coarsely punctate at bottom. The exact shape of the punctures cannot be made out as the specimen is preserved in ventral aspect and only those which show through can be distinguished. Length, 3.85 mm.

Described from a single specimen.

Type.—No. 2,644 M. C. Z. Florissant, Col. (No. 7,176 S. H. Scudder Coll.). A second specimen, No. 2,645 M. C. Z. (No. 10,506 S. H. Scudder Coll.), is most likely the same species.

No doubt need attach to the generic identification, the form, sculpture, and structure of the 11-jointed antennae are those of *Odontota*.

BRUCHIDAE.

SPERMOPHAGUS PLUTO, sp. nov.

Plate 13, fig. 3-4.

Form stout. Head small. Antennae short, not serrate, the joints of the middle portion, at least, squarish. Prothorax showing moderately coarse and deep, closely placed punctures on the flanks, sculpture of the remainder of the underside not defined. Legs of moderate length for the family, the hind femora slightly thickened, hind tibia carinate, straight, with two unequal but fairly long spurs at the apex. Hind coxae not much dilated and scarcely narrowing the basal abdominal segment. Length, 4.75 mm.; to elytral tips, 4 mm.

Described from one specimen showing the underside.

Type.—No. 2,646 M. C. Z. Florissant, Col. (No. 8,843 S. H. Scudder Coll.).

The rounded tips of the elytra show through and at first sight give the impression of being enlarged coxal plates. While the aspect of this insect is decidedly bruchid, I have not been able to assign it to *Bruchus* because of the distinct spurs on the posterior tibia and have therefore given it the above generic position rather than erect a new genus upon the basis of the difference in form of body and in development of the legs. The short antennae will separate it at once from *S. virificatus* and the form of the hind legs will distinguish it from any of the Florissant species of *Bruchus* with which it might otherwise be confused.

BRUCHUS PRIMOTICUS, sp. nov.

Plate 13, fig. 6; Plate 14, fig. 1-2.

Form robust. Head rather large, closely and minutely punctulate. Antennae moderately stout, distinctly but not very strongly serrate. Prothorax minutely punctulate in similar fashion to the head but more strongly and having in addition a moderately coarse and very close punctuation of medium depth, more pronounced at sides and base. Elytra distinctly but rather finely striate, the striae with rows of moderately small, approximate, elongate punctures, interstitial spaces minutely transversely rugose. Hind tibia curved and carinate or grooved, the femur enlarged, with a rather small tooth and a row of

four sharp subequal denticles. Sternal pieces and first abdominal segment finely and closely punctured, the remainder of the abdomen less distinctly. Length, to apex of abdomen, 5.50 mm.; to elytral apex, 5 mm.

Described from one specimen with counterpart.

Type.—No. 2,647, 2,648 M. C. Z. Florissant, Col. (No. 11,269 and 13,031 S. H. Scudder Coll.). The same species is represented by No. 2,649 M. C. Z. (No. 8,428 S. H. Scudder Coll.).

A fine species belonging, by its antennal characters, with *B. exhumatus* and *B. scudderi* from these shales, though larger than either and differing in punctuation from both of them. An interesting feature is shown by the exposure of the hind femur which exhibits an arrangement of tooth and denticles similar to that seen in many recent forms.

BRUCHUS SUBMERSUS, sp. nov.

Plate 13, fig. 7.

Form stout, but the body is so much crushed as to obscure the exact outline. Head minutely punctulate. Antennae long and slender, not serrate. Pronotum with moderate sized round punctures, rather crowded near the base and sides, much finer anteriorly. Elytra with very large epipleural lobe, strongly striate on the disk and sides, the striae becoming evanescent apically, stria punctures hardly wider than the striae, those of each row near together. Interstitial spaces broad and flat, minutely roughened and finely hairy. Sternal pieces and abdomen almost smooth. Hind femur strongly swollen and not visibly toothed, the tibia curved, with a sharp apical spine. Fore and middle legs moderately slender, hairy. Length, as preserved, 5.15 mm.

Described from one specimen.

Type.—No. 2,650 M. C. Z. Florissant, Col. (No. 11,279 S. H. Scudder Coll.).

Probably the best place for this is next to *B. henshawi* with which it agrees in the stout form and rounded elytral stria punctures but the present species is larger, the stria punctures are relatively smaller and less conspicuous and the hind femur is very much more expanded. The great development of the epipleural lobe is noteworthy.

BRUCHUS CARPOPHILOIDES, sp. nov.

Plate 13, fig. 8.

Form slightly elongate. Head too poorly preserved for description. Antennae showing only a few of the intermediate joints which are not serrate but are quite broad. Prothorax produced at the middle of the base into an obtuse lobe, the disk rather finely and sparsely, not deeply punctate, the sides more strongly and closely. Scutellum not visible. Elytra strongly truncate at the apices, punctatostriate, the striae not deep but rather broad, the punctures about as wide as the striae, very slightly elongate, those of the same row practically contiguous. Interstitial areas flat, well clothed with short dark hair. Pygidium with fine and shallow but close punctuation. Legs wanting. Length, as preserved, 3.90 mm.; to elytral tips, 3 mm.

Described from one specimen.

Type.—No. 2,651 M. C. Z. Florissant, Col. (No. 7,555 S. H. Scudder Coll.). It is likely that No. 2,653 M. C. Z. (No. 5,393 S. H. Scudder Coll.) represents the same species, while No. 2,652 (No. 7,332 S. H. Scudder Coll.) certainly belongs here.

Related in most of its characters to *B. henshawi*, but is smaller and relatively more slender, the prothorax shining, with finer and sparser punctuation. In *B. henshawi*, the striae punctures of the elytra are not in the least elongate but under high power appear a trifle transverse and are stronger and more clearly cut than in the present species.

BRUCHUS ABORIGINALIS, sp. nov.

Plate 13, fig. 5.

Form elongate, much broader behind. Head covered by the projecting front margin of the prothorax. Antennae of moderate length, the joints rather strongly serrate, the intermediate ones longer than wide, the remainder not well defined. Pronotum with the front margin strongly arcuate, sides divergent posteriorly to the hind angles, base arcuate but much less than the apex, forming an obtuse lobe. Entire pronotal surface closely, moderately coarsely and distinctly punctured, clothed with short dark hairs. Elytra short, truncate apically, striae not deep nor distinct though rather broad, indistinctly punctate. Interstitial spaces at base punctured like the pronotum,

less coarsely towards the apex. Pubescence short, dark and moderately sparse. Middle legs slender, tibiae straight. Hind femur not shown, the tibia not elongate nor curved, the right one showing the apical spine, first tarsal joint very long and a little curved, the remainder poorly shown. Pygidium minutely alutaceous and hairy. Length, to tip of abdomen, 4.20 mm.; to elytral apex, 2.80 mm.

Described from one specimen.

Type.—No. 2,654 M. C. Z. Florissant, Col. (No. 14,017 S. H. Scudder Coll.).

Entirely different from any of the other Florissant fossil species in the combination of antennal and sculptural characters. At first sight it looks a little like *B. carpophiloides*.

BRUCHUS BOWDITCHI Wickham.

Four specimens, No. 2,655–2,658 M. C. Z. (No. 2,909, 3,119, 8,610, 9,151 S. H. Scudder Coll.).

BRUCHUS HENSHAWI Wickham.

Five examples, No. 2,659–2,663 M. C. Z. (No. 8,397, 8,657, 8,834, 8,841, 8,851 S. H. Scudder Coll.).

BRUCHUS HAYWARDI Wickham.

Represented by two specimens. No. 2,664, 2,665 M. C. Z. (No. 435, 13,585 S. H. Scudder Coll.).

BRUCHUS SCUDDERI Wickham.

One specimen, No. 2,666 M. C. Z. (No. 8,332 S. H. Scudder Coll.).

BRUCHUS WILSONI Wickham.

Three specimens, No. 2,667–2,669 M. C. Z. (No. 4,826, 5,917, 9,569 S. H. Scudder Coll.).

BRUCHUS EXHUMATUS Wickham.

Five specimens No. 2,670-2,674 M. C. Z. (No. 446, 1,154, 5,766, 7,237, 10,920 S. H. Scudder Coll.).

BRUCHUS FLORISSANTENSIS Wickham.

Three examples, No. 2,675-2,677 M. C. Z. (No. 2,150, 8,744, 11,272 S. H. Scudder Coll.).

TENEBRIONIDAE.

PROTOPLATYCERA, gen. nov.

Aspect tenebrionoid. Integuments heavy. Form probably moderately slender, the prothorax narrower than the elytra. Sculpture light. Head rather small, eyes nearly circular, separated on the vertex by about the width of one. Antenna with the two (or possibly three, since the second may be small and inconspicuous) basal joints slender, the remainder broad and flat, proportioned as shown in the figure.

Type.—*P. laticornis*, sp. nov.

PROTOPLATYCERA LATICORNIS, sp. nov.

Plate 14, fig. 3-4.

Moderately elongate, as preserved, in life probably less so. Head narrow, longer than wide. Eyes small, suborbicular. Antennae, if extended backward, reaching slightly beyond the elytral bases. Prothorax apparently only about as wide as the head, with subparallel sides, but not in very good condition. Elytra rather short, a little more than two and one half times as long as wide, apices bluntly rounded. Legs poorly preserved but evidently moderately stout. Length, in position on the stone, from front of head to abdominal apex, 7.10 mm.; of elytron, 3.80 mm.

Described from one specimen.

Type.—No. 2,678 M. C. Z. Florissant, Col. (No. 13,070 S. H. Scudder Coll.).

A remarkable insect which I have placed for the present in the Tenebrionidae, without being able to suggest any tribal affinities.

have been entirely unable to find any modern insect with antennae of the type shown by the fossil. The sculpture is obscure but there is no sign of striation or heavy punctuation on any part of the body.

EPHALUS ADUMBRATUS Scudder.

The reverse of the specimen which served as the type for Scudder's figure is in the series transmitted to me. It is No. 2,679 M. C. Z. (No. 6,469 S. H. Scudder Coll.).

CISTELIDAE.

CISTELA VULCANICA, sp. nov.

Plate 14, fig. 5.

Form elongate oval. Head exposed, projecting, a little wider than long, mandibles only slightly prominent. Eyes not well defined but what remains indicates that they were rather small and widely separated on the vertex. Antennae long and slender, only very feebly serrate basally, reaching nearly to the middle of the elytra, the second joint short, those following the third subequal in length, each more than twice as long as wide. Prothorax, as preserved, considerably more than twice as wide as long, sides in rather poor condition but the better preserved one indicates that they were gradually rounded from the broad base to the much narrower apex. Scutellum subcordiform, small. Elytra a little less than four times the prothoracic length, rounded at apices. Legs not displayed. Length, to elytral tip, 14 mm.; of elytron, 10.35 mm.

Described from one specimen with counterpart.

Type.—No. 2,680, 2,681 M. C. Z. Florissant, Col. (No. 416 and 418 S. H. Scudder Coll.).

The entire upper surface is finely sculptured and clothed with rather close short hairs. The insect looks a good deal like the Florissant fossil *C. antiqua* but has longer and more slender antennae. It seems that the two are probably congeneric and may possibly represent the two sexes of a single species.

Plate 14, fig. 6-7.

Form elongate oval. Head rather small, eyes not prominent. Antennae long enough to reach slightly beyond the elytral bases, relatively a little stouter than in the recent species known to me and with the third joint proportionately shorter. They are scarcely serrate and the distal joints are a little shortened. Prothorax about one and two thirds times as broad as long, sides regularly rounding to the apex which is much narrower than the base. Elytra each about three times as long as wide, subparallel anteriorly to behind the middle, apices conjointly rounded. Legs wanting except one of the anterior pair which is of normal build. Length, from front of head to elytral apex, 8.35 mm.

Described from one specimen.

Type.—No. 2,682 M. C. Z. Florissant, Col. (No. 510 S. H. Scudder Coll.).

This is strikingly like our common recent *I. sericea*, (*Cistela sericea* Say) in appearance, but is larger. The weak sculpture of this genus is not preserved in the fossil.

HYMENORUS HAYDENI, sp. nov.

Plate 14, fig. 8.

Form moderately elongate and apparently subparallel although the insect is preserved lying partly upon one side and the exact shape is thus obscured. Head rather large, though neither as long nor as wide as the prothorax, eyes of good size, somewhat narrowly separated, surface sculpture obliterated. Antennae slender, the joints following the third subequal in length, as far as shown, and fully twice as long as wide. If extended backward, the apex of the seventh joint would reach about to the basal prothoracic margin. Prothorax, as preserved, somewhat less than one and one half times as wide as long. Elytra approximately three times as long as the prothorax, fairly sharply pointed at apex, surface very obscurely striate but without visible punctuation. The entire insect appears to be scabrous, but this is probably due to the texture of the stone and the rather soft consistency of the integuments before fossilization. Length, 7.15 mm.

Described from one specimen.

Type.—No. 2,683 M. C. Z. Florissant, Col. (No. 4,412 S. H. Scudder Coll.).

This has all the appearance of a cistelid of the general type of *Hymenorus*. It is easily distinguished from *Isomira florissantensis* by the different antennae.

The name is given in memory of the late Dr. F. V. Hayden.

OEDEMERIDAE.

COPIDITA MIOCENICA, sp. nov.

Plate 15, fig. 1-2.

Form elongate and rather slender. Head long, muzzle strongly projecting. Eye not shown in entirety. Antennae rather short, the distal joints visibly shorter than the subbasal ones, serration slight. Prothorax, as preserved, distinctly longer than broad, the sides not in good enough condition to be certain of their form. Elytra about four and two thirds times as long as the prothorax, sides parallel, apices bluntly rounded. Legs slender but not very long. Length, to elytral apices, 11.90 mm.; of elytron, 8.35 mm.

Described from one specimen.

Type.—No. 2,684 M. C. Z. Florissant, Col. (No. 12,481 S. H. Scudder Coll.).

This insect must have been of about the same build as the recent Colorado species, *C. bicolor* and *C. obscura*. The entire upper surface of the body was clothed with short hairs, sparsely preserved but perhaps more numerous in life. The antennae and legs are covered with much finer and closer hairs. The similarity of antennal structure in the recent and fossil species is quite pronounced, as far as the joints can be definitely made out but unfortunately the entire base is poorly exhibited upon the stone. The sculpture was evidently faint as nothing but the merest traces of fine punctuation can be distinguished.

PALOEDEMERA, gen. nov.

Form stout. Mandibles prominent. Elytra apparently not much if at all narrowed apically. Legs stout, posterior with strongly thickened and toothed femur, tibia curved and produced at apex, tarsus

moderately broad. first and fourth joints longer, the latter of greater length and more slender.

Type.—*P. crassipes*, sp. nov.

PALOEDEMERA CRASSIPES, sp. nov.

Plate 15, fig. 3-4.

Body of heavy build. Head prominent, mandibles projecting. Eye elliptical or nearly so, rather large. Antenna showing only the four proximal joints, which are stout, the third shorter than the fourth. Prothorax, in side view, not arched along the back, finely scabrous. Elytron long, tip obtusely rounded, sculpture fine and scabrous, about like that of the prothorax. Fore leg moderately stout, tibia straight, tarsus not expanded, hind leg as described in the generic diagnosis. Length, to elytral tip, 16.90 mm.; of elytron, 13 mm.

Described from one specimen with counterpart.

Type.—No. 2,685, 2,686 M. C. Z. Florissant, Col. (No. 1,000 and 1,001 S. H. Scudder Coll.).

This assignment to the Oedemeridae must be taken with caution. There is very little to go upon aside from the texture of the body and the thickening of the hind femur. The latter character has chiefly influenced my decision. While the family position must be considered purely provisional, the insect seems sufficiently remarkable to deserve a name. The hind femur is detached and at a slightly lower level in the stone, but I think it belongs with the rest of the specimen.

MORDELLIDAE.

TOMOXIA INUNDATA, sp. nov.

Plate 15, fig. 5.

Preserved in profile. Form somewhat more than usually elongate. Head small, antenna long and slender, about equal to the thoracic height. Prothorax strongly arched. Elytra bluntly rounded at apex, surface with very fine and weak indications of striae. Legs in a rather hazy state of preservation and evidently somewhat shifted but the hind pair is shown to be of normal form with long tarsi. Abdomen

projecting far beyond the elytral apex. Length, to abdominal tip, 8.75 mm.; of elytron, 6.50 mm.

Described from one specimen with counterpart.

Type.—No. 2,687, 2,688 M. C. Z. Florissant, Col. (No. 7,972 and 7,976 S. H. Scudder Coll.).

This is very easily separable from the other Florissant species of the family by the much greater size and more elongate form. It looks like the recent *T. hilaris*, found in our eastern states.

MORDELLA STYGIA, sp. nov.

Plate 15, fig. 6.

Form stout. Head mutilated. Antennae slender, the nine joints which are visible subequal in length and hardly incrassate distally. Pronotum rather strongly arched, minutely and closely punctulate, too finely for definition under a hand lens. Elytron rounded at tip, relatively long, sculpture of the same nature as that of the prothorax but even less pronounced. Under surface of body somewhat rugosely punctulate on the meso- and metasternal flanks, less strongly and a little less closely on the abdomen. Anal style short and stout. Legs small, not very stout. Length, to elytral apex, 4.35 mm.; of elytron, 3.20 mm.

Described from one specimen.

Type.—No. 2,689 M. C. Z. Florissant, Col. (No. 9,968 S. H. Scudder Coll.).

There should be no difficulty in recognizing this species. It is considerably smaller than the Florissant fossil *Mordella lapidicola* and much larger than either of the two species of *Mordellistena* described from these shales. I have placed it in the former genus, in preference to the latter, on account of its size and rather heavy build.

MORDELLISTENA SCUDDERIANA Wickham.

Four specimens, No. 2,690-2,693 M. C. Z. (No. 5,425, 6,269, 10,241, 11,186 S. H. Scudder Coll.), none with counterparts.

ANTHICIDAE.

LITHOMACRATRIA, gen. nov.

Form similar to *Corphyra*. Antennae, in general, of the type seen in the modern genus *Macratría* but more highly differentiated, the distal three joints much longer than all of the remainder, slightly incassate. Prothorax short, transverse, not elongate as in *Macratría*.

Type.—*L. mirabilis*, sp. nov.

LITHOMACRATRIA MIRABILIS, sp. nov.

Plate 16, fig. 1-2.

Form moderately stout. Head not enlarged, tempora rounded, surface nearly smooth but with a visible alutaceous sculpture. Palpus, probably maxillary, enlarged apically. Antennae moderately long, reaching, in life, about to the base of the elytra, joints two to eight short, subequal, not serrate, ninth and tenth each about equal to the sixth, seventh, and eighth united, eleventh more than four fifths as long as the combined ninth and tenth, these distal three joints only a little broader than the others. Prothorax about as long as the head, sculpture minute. Elytra about three and one half times as long as the prothorax, finely punctulate and moderately closely clothed with brownish hairs which do not at all conceal the surface. Abdomen alutaceous. Legs not very well preserved, fairly slender. Length, as preserved, 7.30 mm.; of elytron, 4.60 mm.

Described from one specimen with counterpart.

Type.—No. 2,694, 2,695 M. C. Z. Florissant, Col. (No. 11,257 and 13,655 S. H. Scudder Coll.).

My idea is that this fossil should belong near *Macratría*, but the basis for this opinion rests mostly upon the type of antennal structure. The aspect is decidedly more that of *Corphyra* and the size also corresponds better with the latter genus. It seems, by description, to differ from *M. gigantea* in being smaller and having a different prothorax and antennae, but the type of *M. gigantea* is not now at hand for comparison.

CORPHYRA CALYPSO, sp. nov.

Plate 16, fig. 3-4.

Form moderately robust. Head small, eyes destroyed but the orbits indicate that they were of good size. Antenna only slightly serrate, slender but not very long, the basal joints in poor condition, the intermediate ones about one and one half times as long as wide. Prothorax suborbicular, sculpture obliterated. Elytra four times as long as the prothorax, sides subparallel, apices bluntly rounded, sculpture very obscure, apparently a confused close punctation or rugosity, two or three longitudinal lines showing on each which are probably due, in part at least, to underlying wing veins. Fore leg, the only one showing, rather short and quite stout. Length, as preserved, 8.50 mm.; to elytral apex, 8.40 mm.; of elytron, 5.70 mm.

Described from one specimen.

Type.—No. 2,696 M. C. Z. Florissant, Col. (No. 8,706 S. H. Scudder Coll.).

The form, size, and, as far as shown, the sculpture, are those of *Corphyra*. The antennae agree very well if we assume that the third joint is broken off in the middle and that the break immediately preceding the first of these sections represents the place of the second joint. The small head makes it unlikely that the insect is a meloide.

MELOIDAE.

TETRAONYX MINUSCULA, sp. nov.

Plate 16, fig. 5.

Preserved in profile. Form moderately stout. Head large, finely punctate and clothed with sparse blackish hairs. Antennae showing the distal six joints which increase in length apically and are submoniliform. Prothorax higher than long, surface shining like that of the head, punctuation fine and sparse, giving rise to long dark hairs of greater length than those on the head. Elytron finely, sparsely punctured and hairy, the hairs shorter than those of the prothorax or less well preserved. Legs rather stout and clothed with sparse dark hairs. Abdomen and side-pieces of the meso- and metasternum obscurely punctate and nearly smooth except that a few hairs may be seen in

species of that genus in the long, slender antennae. Compared with the otiorhynchids described by Dr. Scudder, it seems to be nearest *Eropes veneratus* but the present species is larger, more finely and closely punctured on the elytra and with straight instead of geniculate antennae.

ANTHRIBIDAE.

BRACHYTARSUS (?) DUBIUS Wickham.

A single specimen, No. 2,706 M. C. Z. (No. 3,425 S. H. Scudder Coll.), is contained in the series. It is a little smaller than my type.

EXPLANATION OF PLATES.

PLATE 1.

PLATE 1.

- Fig. 1. *Bidessus laminarum*.
 Fig. 2. *Hydropcrus sedimentorum*.
 Fig. 3. *Silpha beutenmuelleri*.
 Fig. 4. *Coccinella florissantensis*.
 Fig. 5. *Tritoma diluviana*.
 Fig. 6. *Tritoma diluviana*, antenna.
 Fig. 7. *Rhagoderidea striata*.
 Fig. 8. *Rhagoderidea striata*, right antenna.
 Fig. 9. *Rhagoderidea striata*, left antenna.

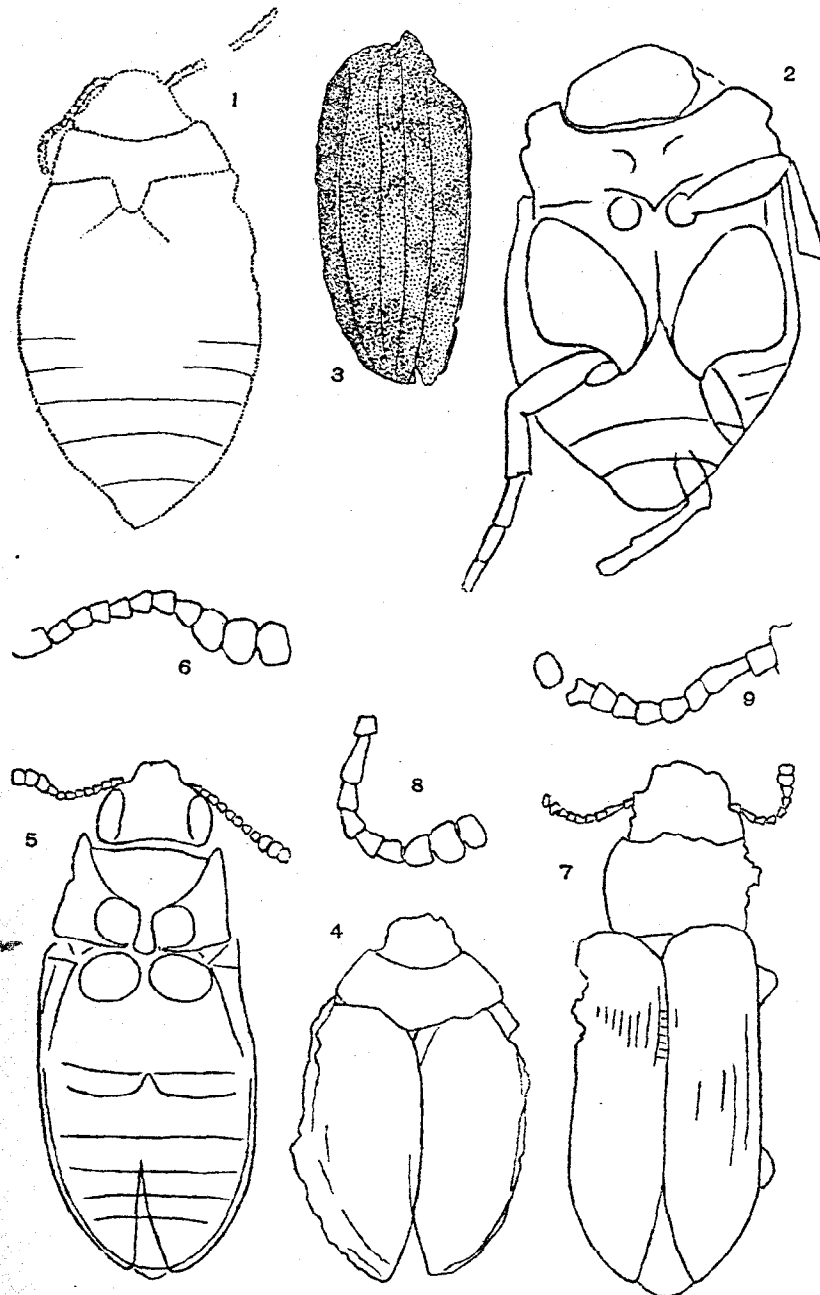


PLATE 2.

- Fig. 1. *Cryptophagus scudderi*.
- Fig. 2. *Cryptophagus scudderi*, antenna.
- Fig. 3. *Corticaria oclusa*.
- Fig. 4. *Corticaria egregia*.
- Fig. 5. *Chelonarium montanum*.
- Fig. 6. *Miocyphon punctulatus*.
- Fig. 7. *Miocyphon punctulatus*, antenna.
- Fig. 8. *Miocyphon punctulatus*, elytral punctuation.
- Fig. 9. *Eucnemis antiquatus*.

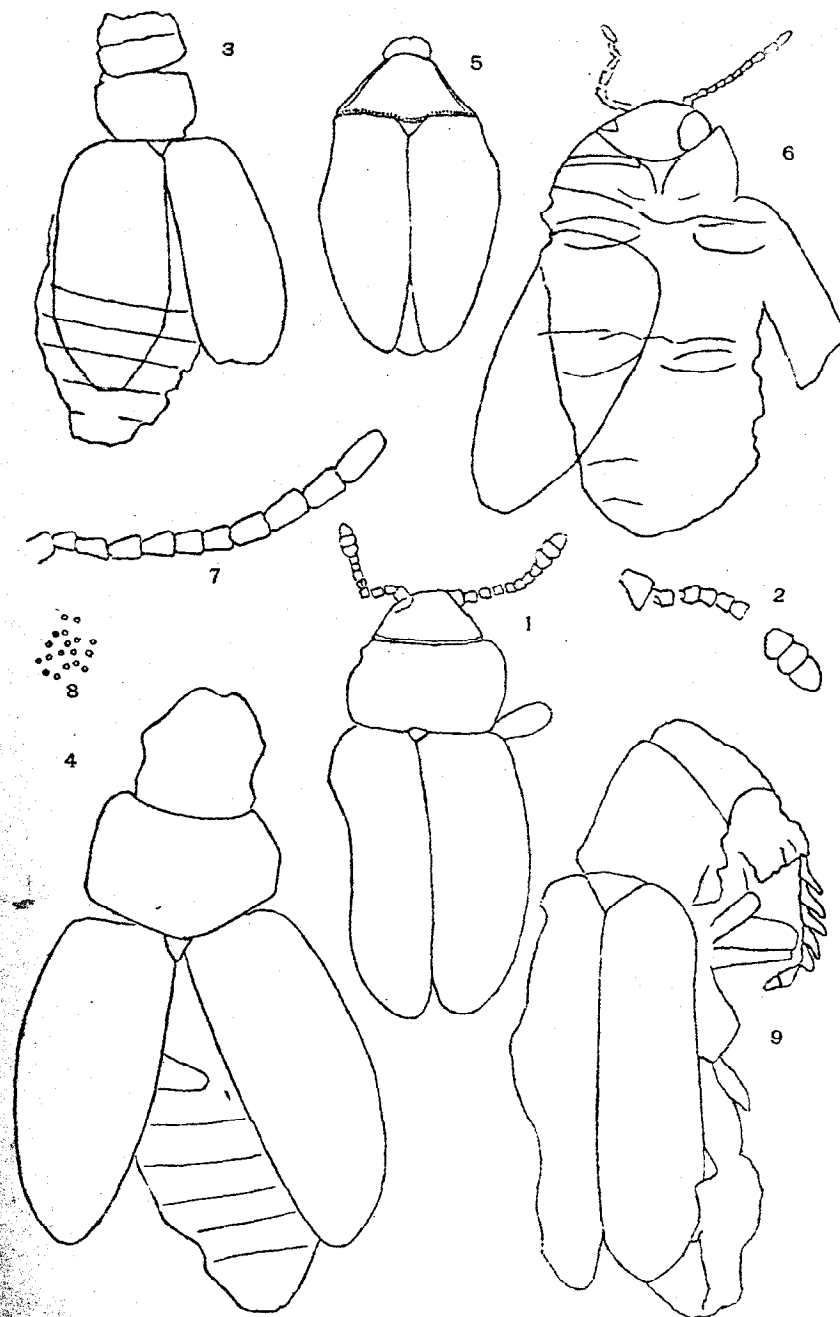


PLATE 3.

- Fig. 1. *Dicercia eurydice*.
- Fig. 2. *Buprestis florissantensis*.
- Fig. 3. *Buprestis scudderi*.
- Fig. 4. *Chrysobothris suppressa*.
- Fig. 5. *Chrysobothris coloradensis*.
- Fig. 6. *Ptosima silvatica*.
- Fig. 7. *Agrilus praepolitus*.



PLATE 4.

- Fig. 1. *Podabrus fragmentatus*.
Fig. 2. *Podabrus florissantensis*.
Fig. 3. *Telephorus hesperus*.
Fig. 4. *Polemius crassicornis*.
Fig. 5. *Protacnaeus tenuicornis*.

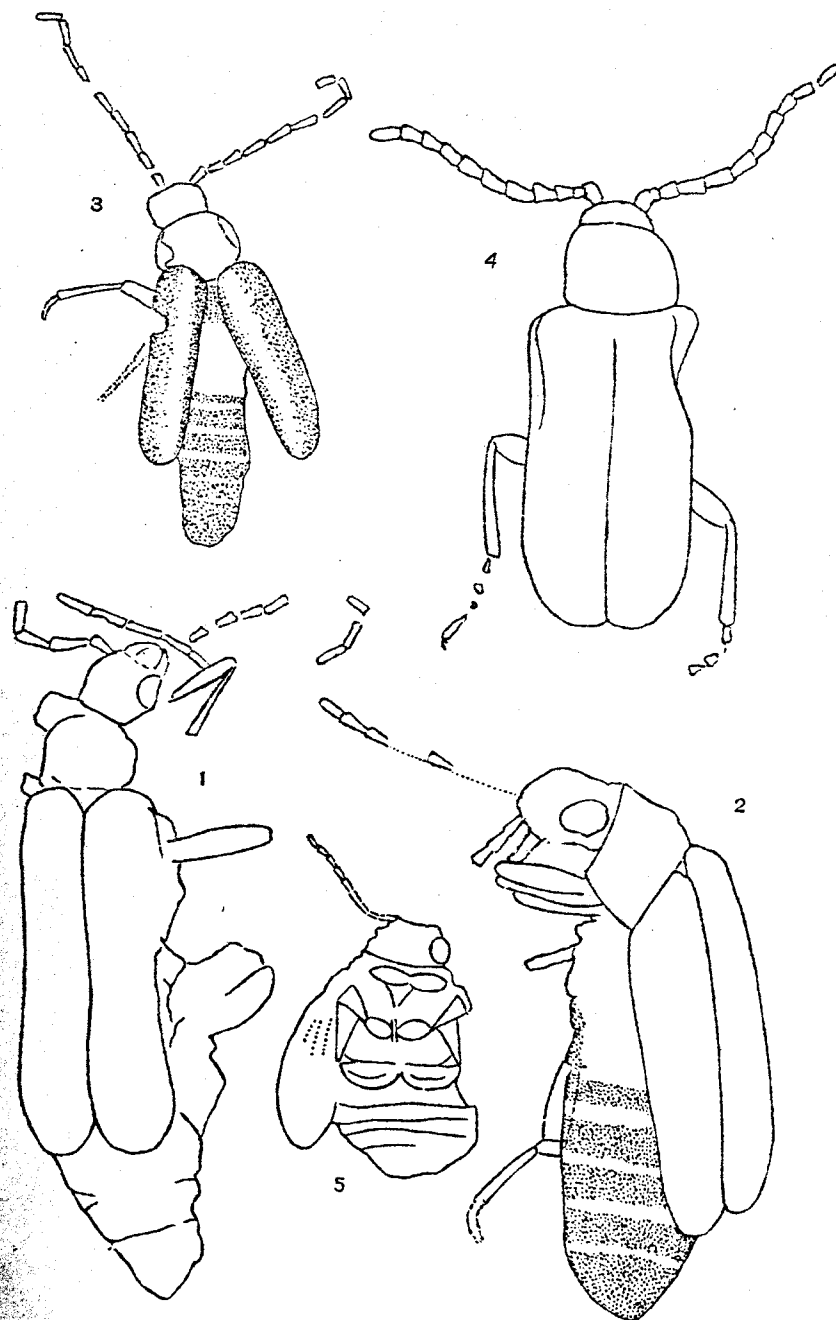


PLATE 5.

- Fig. 1. *Miocaenia pectinicornis*.
 Fig. 2. *Miocaenia pectinicornis*, tip of antenna.
 Fig. 3. *Collops priscus*.
 Fig. 4. *Collops priscus*, antenna.
 Fig. 5. *Collops desuetus*.
 Fig. 6. *Collops extrusus*.
 Fig. 7. *Collops extrusus*, antenna.
 Fig. 8. *Enoclerus florissantensis*.
 Fig. 9. *Enoclerus pristinus*.
 Fig. 10. *Necrobia divinatoria*.
 Fig. 11. *Necrobia divinatoria*, antennal apex.

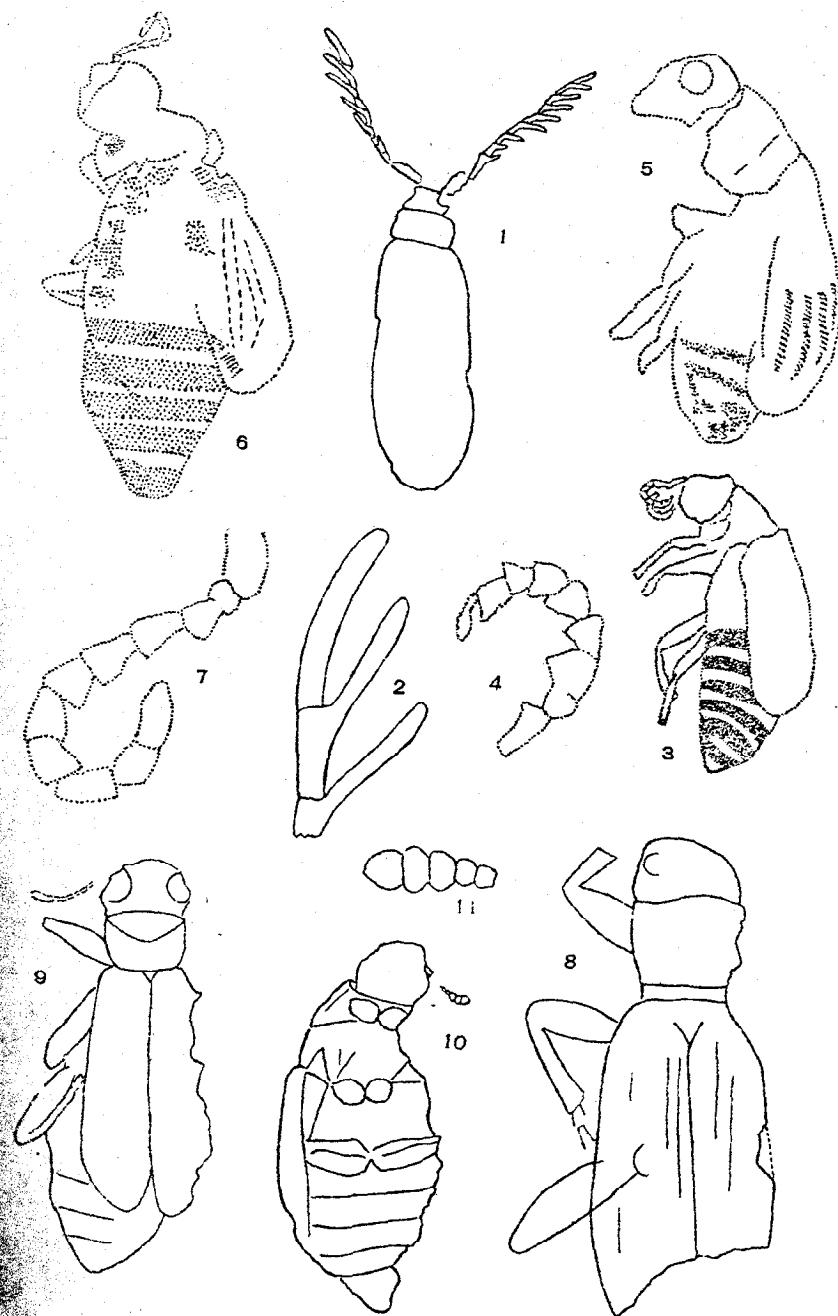


PLATE 6.

- Fig. 1. *Ernobius effetus*.
 Fig. 2. *Oligomerus florissantensis*.
 Fig. 3. *Oligomerus* (?) *duratus*.
 Fig. 4. *Amphicerus sublaevis*.
 Fig. 5. *Aphodius mediaevus*.
 Fig. 6. *Aphodius mediaevus*, elytral punctuation.
 Fig. 7. *Aphodius mediaevus*, fore leg.
 Fig. 8. *Aphodius senex*.
 Fig. 9. *Serica antediluviana*.
 Fig. 10. *Listrochelus puerilis*.
 Fig. 11. *Ligyris effetus*.

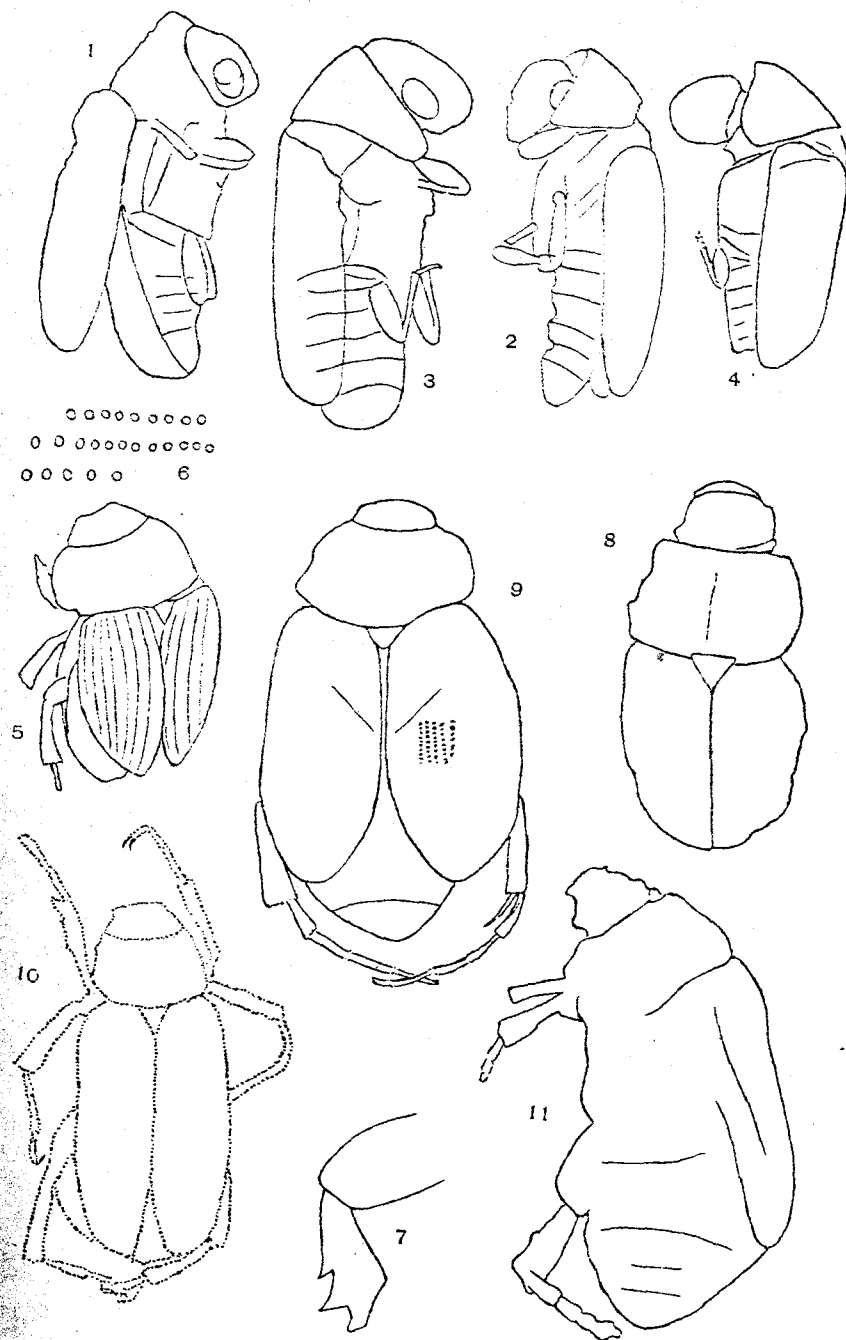


PLATE 7.

- Fig. 1. *Oxyomus nearcticus*.
 Fig. 2. *Hoplia striatipennis*.
 Fig. 3. *Anomala exterranea*.
 Fig. 4. *Strategus cessaatus*.

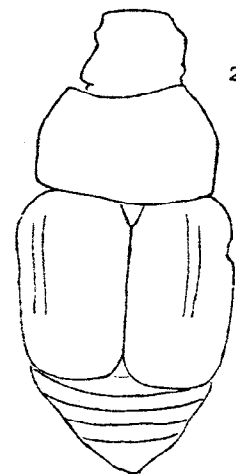
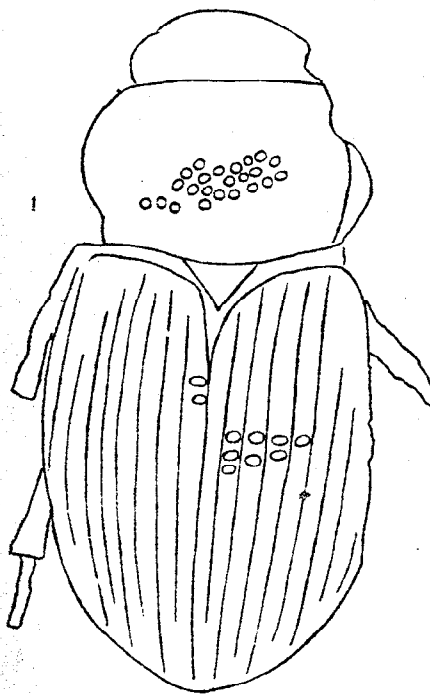
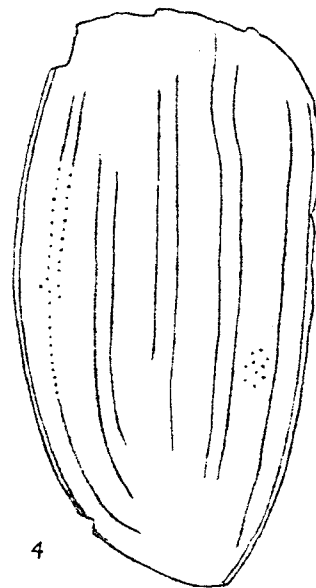
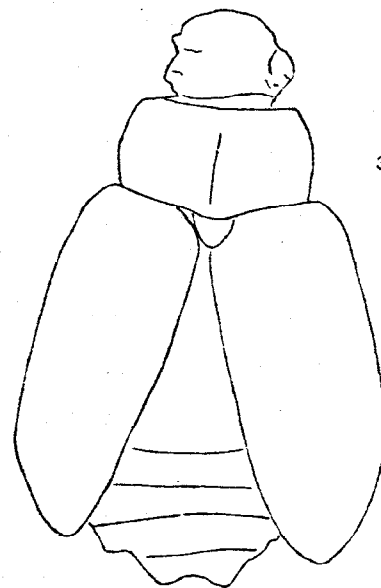


PLATE 8.

- Fig. 1. *Miolachnosterna tristoides*.
 Fig. 2. *Miolachnosterna tristoides*, hind tarsus.
 Fig. 3. *Miolachnosterna tristoides*, fore tibia.
 Fig. 4. *Anomala scudleri*.
 Fig. 5. *Anomala scudleri*, claws of fore tarsus.
 Fig. 6. *Anomala scudleri*, claws of middle tarsus.
 Fig. 7. *Elaphidion extinctum*.

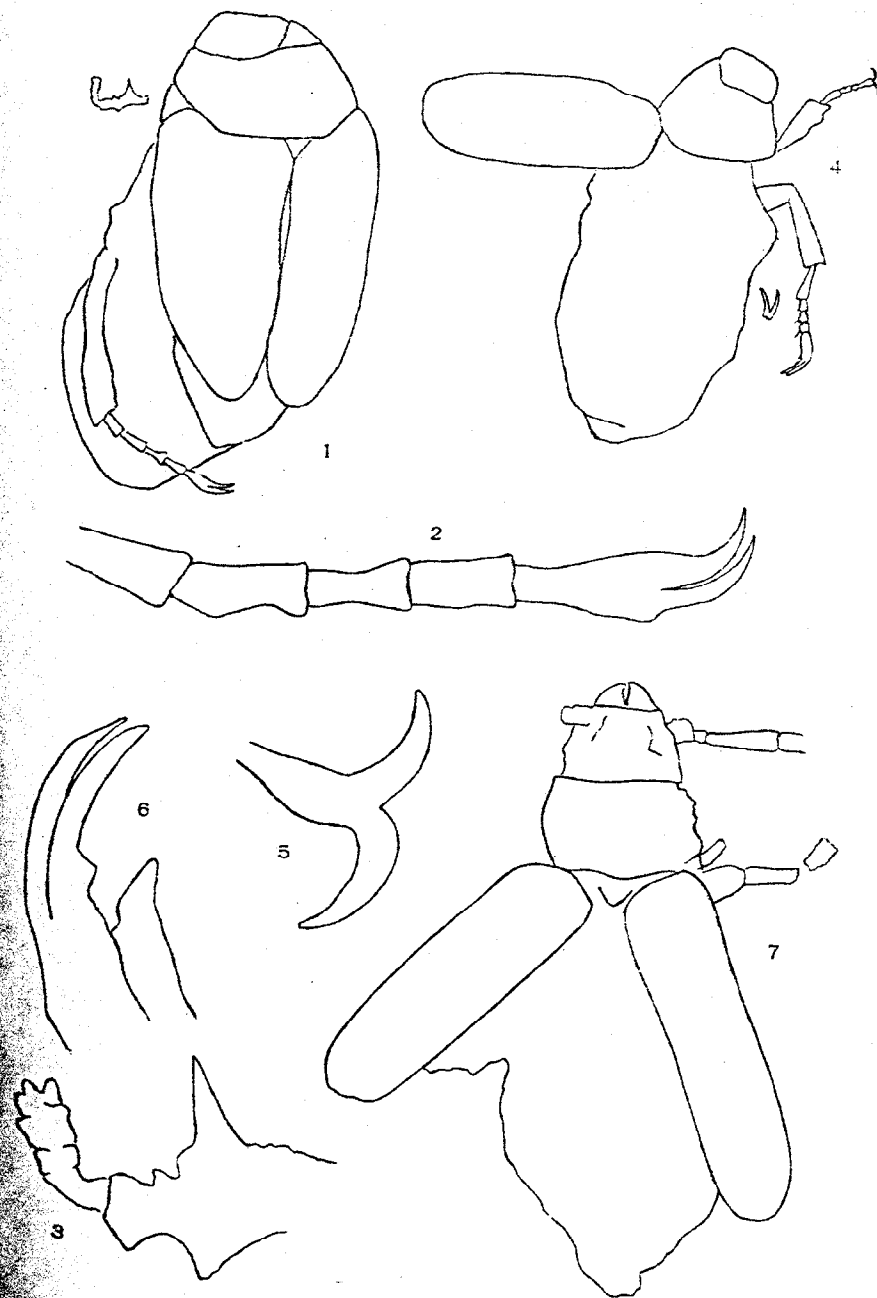


PLATE 9.

- Fig. 1. *Phymatodes* (?) *miocenicus*.
Fig. 2. *Stenosphenus* *pristinus*.
Fig. 3. *Gaurotus* *striatopunctatus*.
Fig. 4. *Leptura* *nanella*.
Fig. 5. *Protipochus* *vandykei*, antenna.

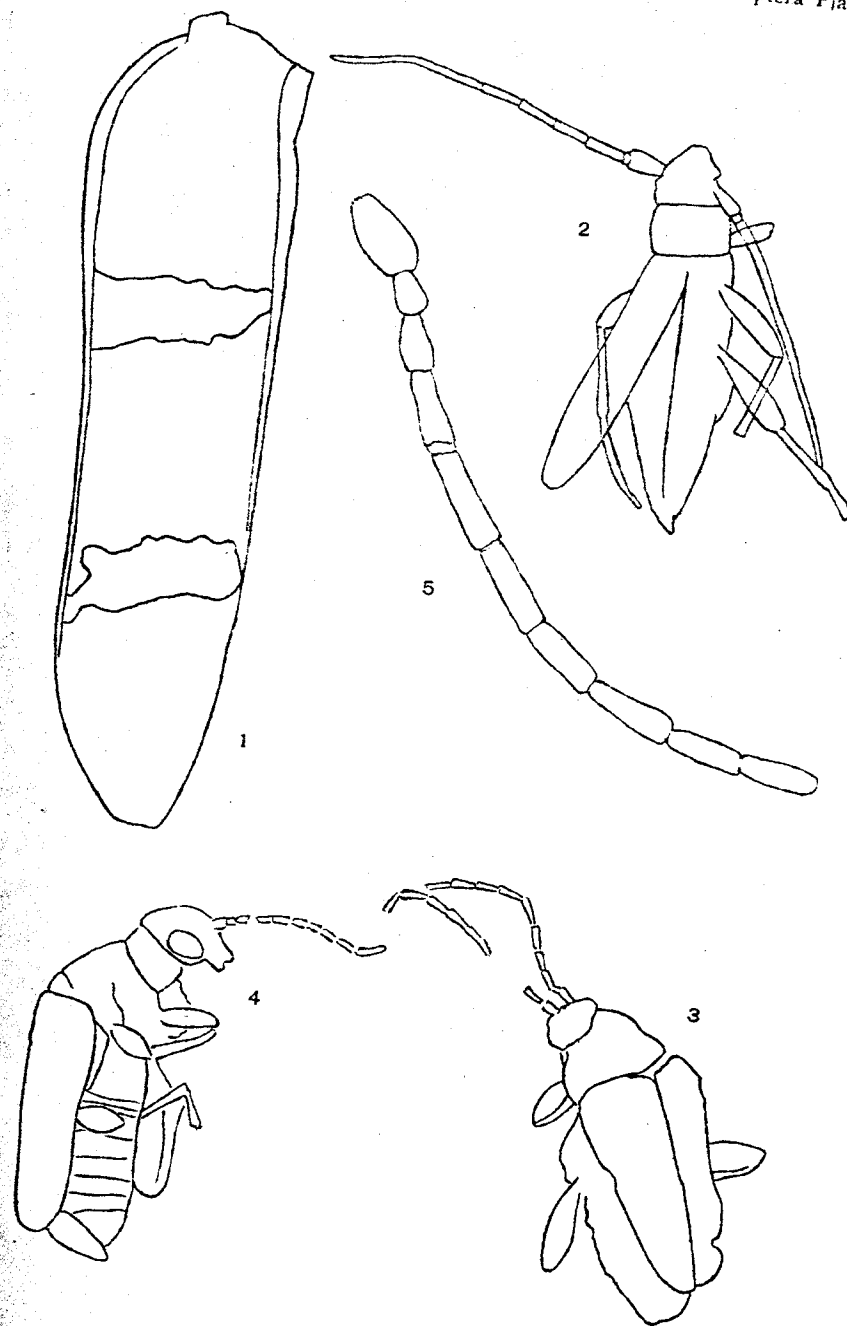


PLATE 10.

- Fig. 1. *Clytus florissantensis*.
 Fig. 2. *Leptura ingenua*.
 Fig. 3. *Protipochus vandykei*.
 Fig. 4. *Protipochus vandykei*, middle leg.
 Fig. 5. *Leptostylus scudleri*.

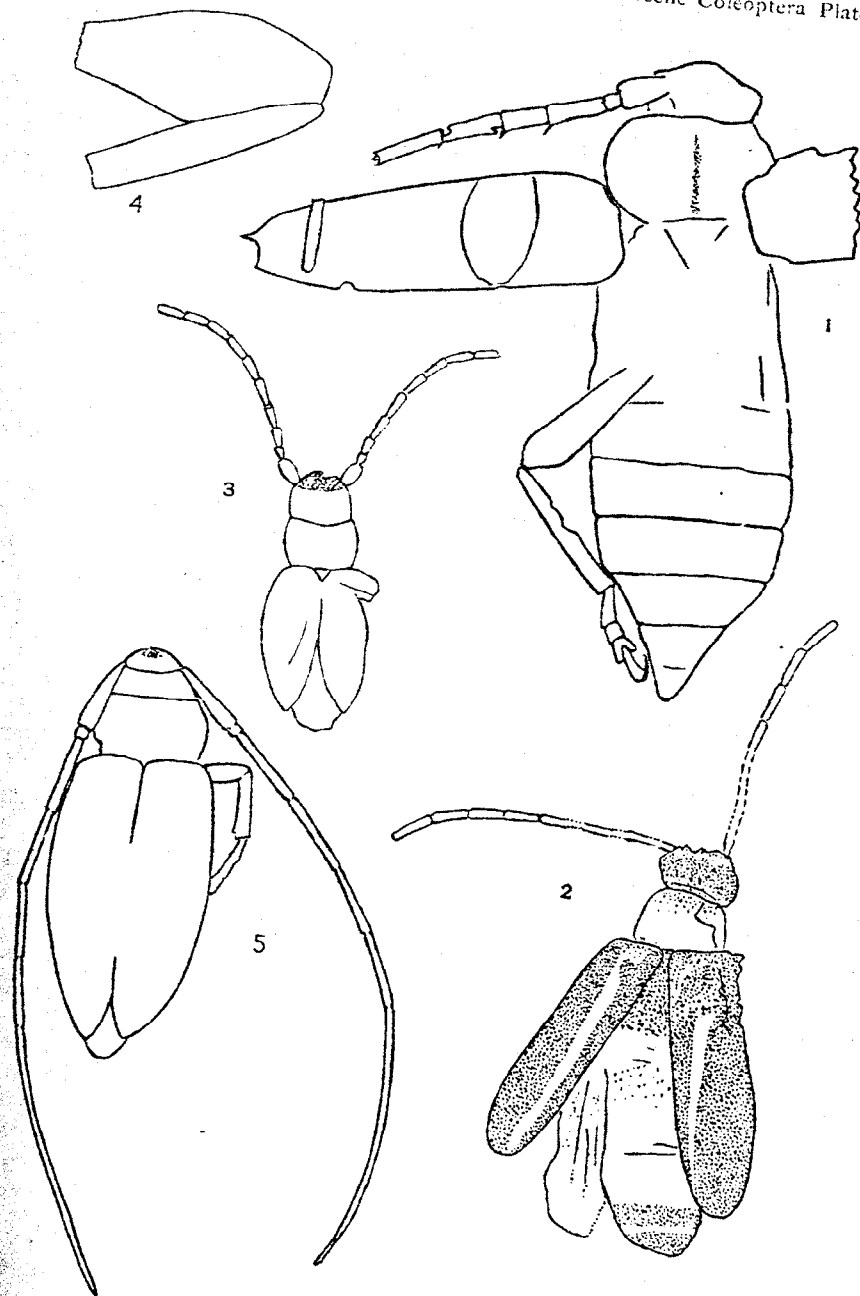


PLATE 11.

- Fig. 1. *Colaspis diluvialis*.
- Fig. 2. *Colaspis proserpina*.
- Fig. 3. *Diabrotica florissantella*.
- Fig. 4. *Diabrotica bowditchiana*.
- Fig. 5. *Diabrotica uteana*.
- Fig. 6. *Trirhabda sepulta*.
- Fig. 7. *Odontota americana*.
- Fig. 8. *Odontota americana*, antenna.
- Fig. 9. *Odontota americana*, antenna.

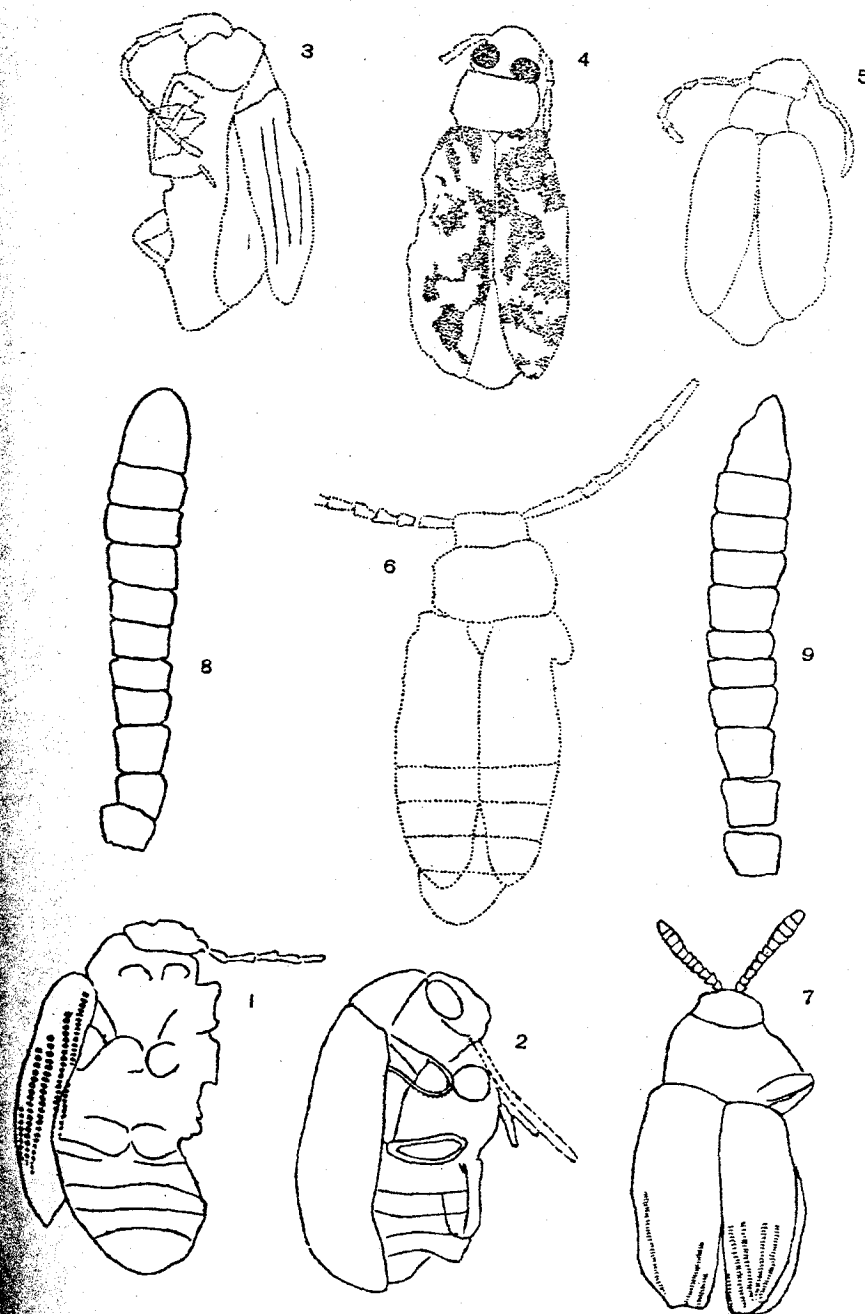


PLATE 12.

- Fig. 1. *Trirhabda majuscula*.
Fig. 2. *Trirhabda megacephala*.
Fig. 3. *Prochaetocnema florissantella*.
Fig. 4. *Plectrotetrophanes hageni*.

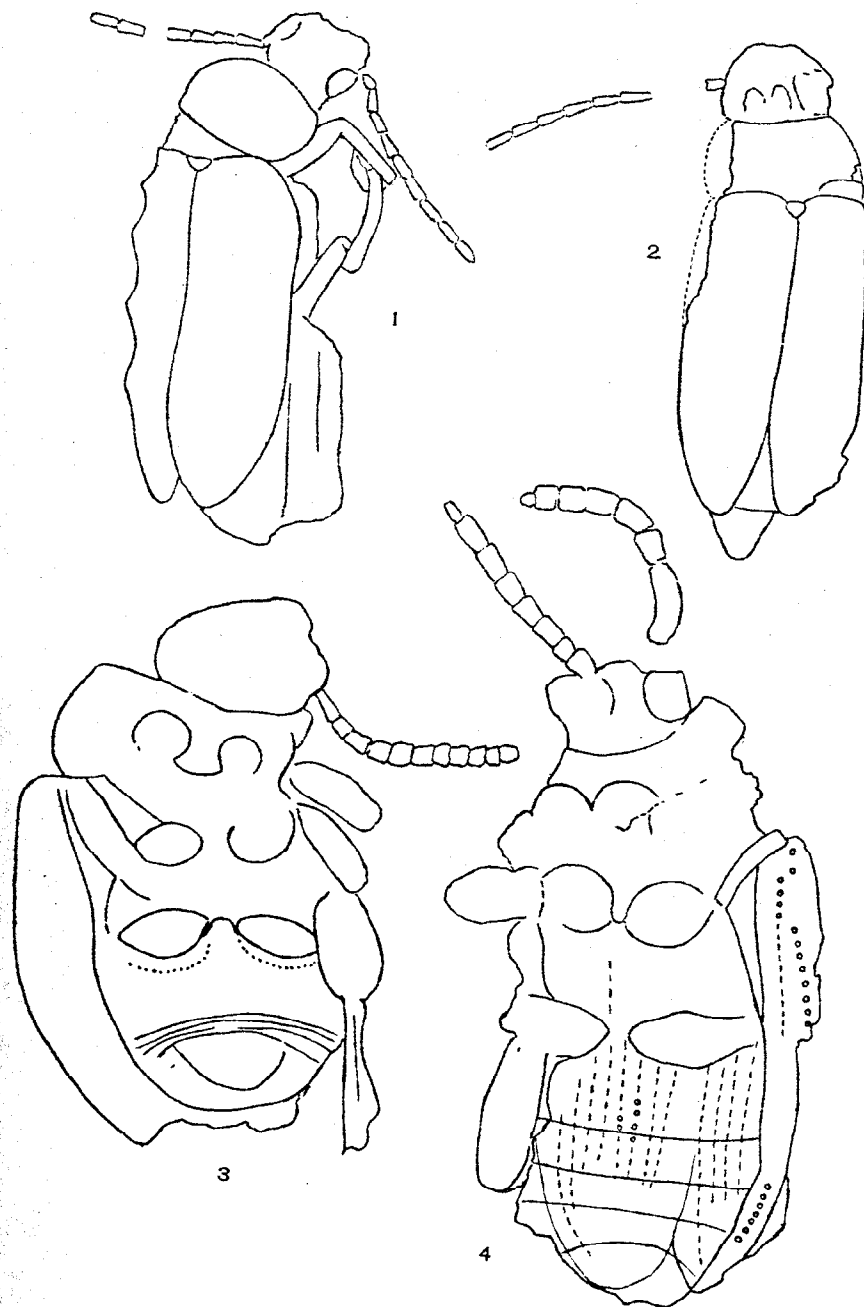


PLATE 13

- Fig. 1. *Lema fortior*.
 Fig. 2. *Haltica renovata*.
 Fig. 3. *Spermophagus pluto*.
 Fig. 4. *Spermophagus pluto*, antenna.
 Fig. 5. *Bruchus aboriginalis*.
 Fig. 6. *Bruchus primoticus*.
 Fig. 7. *Bruchus submersus*.
 Fig. 8. *Bruchus carpophiloides*.

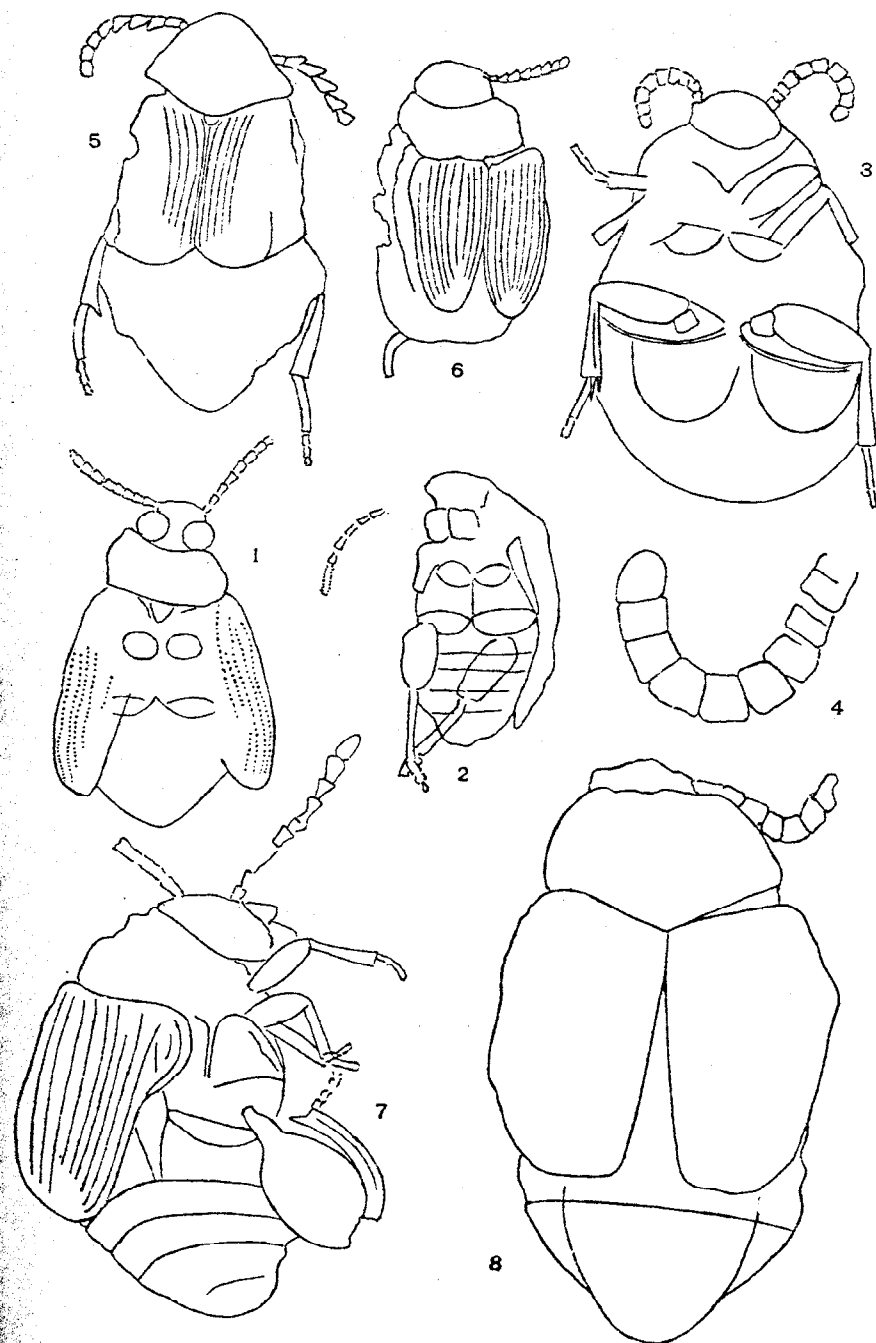


PLATE 14.

- Fig. 1. *Bruchus primoticus*, hind leg.
 Fig. 2. *Bruchus primoticus*, antenna.
 Fig. 3. *Protoplatycera laticornis*.
 Fig. 4. *Protoplatycera laticornis*, antenna.
 Fig. 5. *Cistela vulcanica*.
 Fig. 6. *Isomira florissantensis*.
 Fig. 7. *Isomira florissantensis*, antenna.
 Fig. 8. *Hymenorus haydeni*.

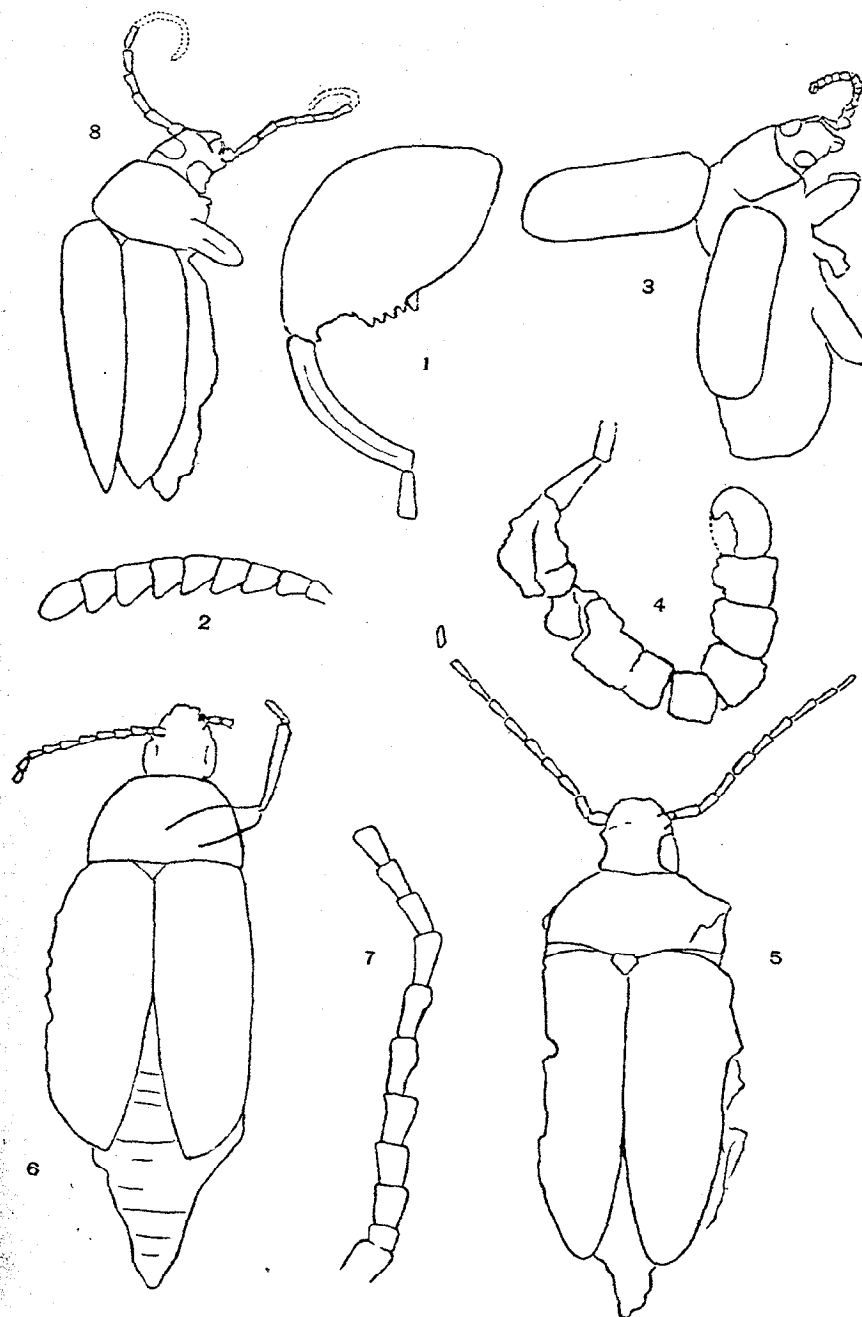


PLATE 15.

- Fig. 1. *Copidita miocenica*.
- Fig. 2. *Copidita miocenica*, antenna.
- Fig. 3. *Paloedemera crassipes*
- Fig. 4. *Paloedemera crassipes*, hind leg.
- Fig. 5. *Tomoxia inundata*.
- Fig. 6. *Mordella stygia*.

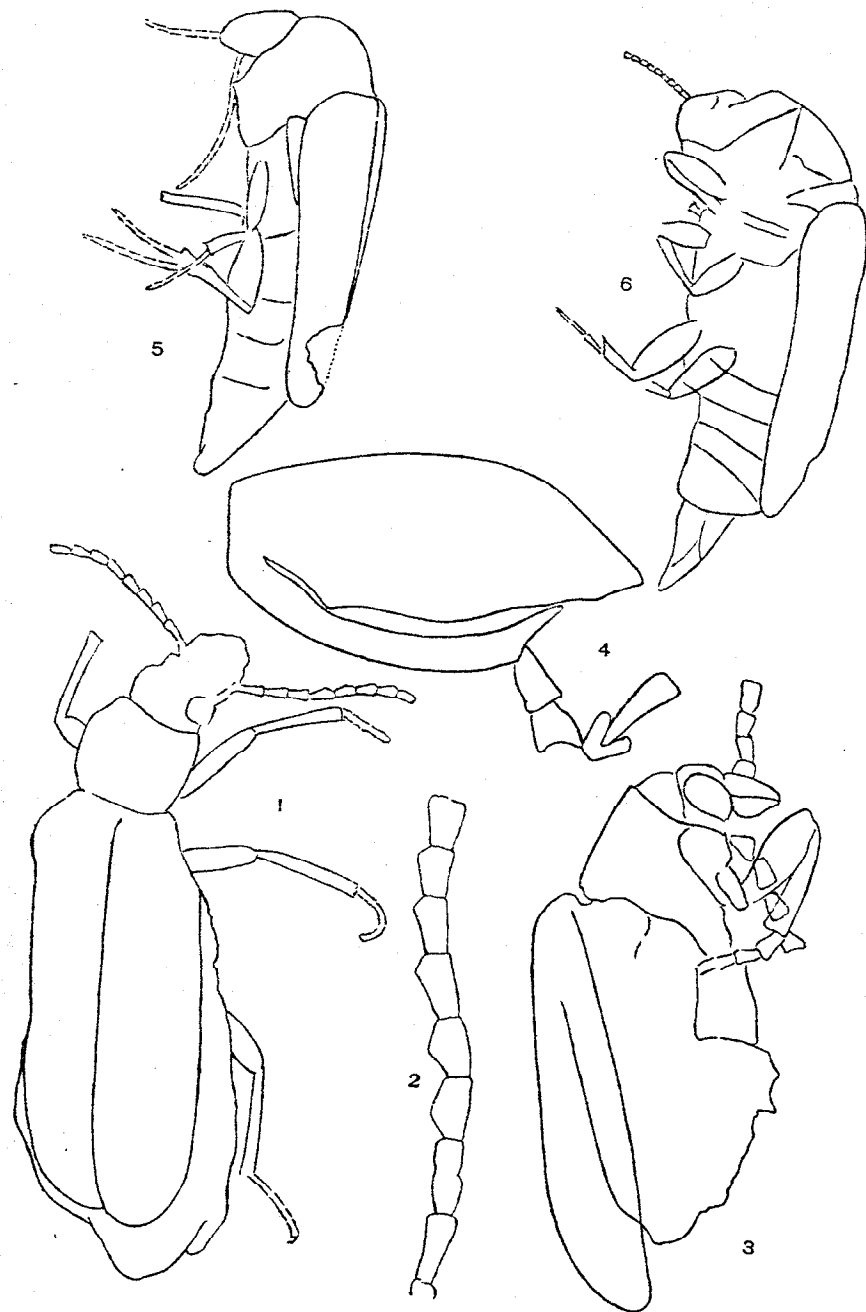


PLATE 16.

- Fig. 1. *Lithomacratia mirabilis*.
- Fig. 2. *Lithomacratia mirabilis*, antenna.
- Fig. 3. *Corphyra calypso*.
- Fig. 4. *Corphyra calypso*, antenna.
- Fig. 5. *Tetraonyx minuscula*.
- Fig. 6. *Epicauta subneglecta*.
- Fig. 7. *Cantharis lithophilus*.
- Fig. 8. *Cyphus florissantensis*.

